

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL

FOUNDED 1880



The twin towers of the new Waldorf-Astoria Hotel will shortly be another landmark on New York's ever changing skyline. These two towers are sheathed in copper. Details of the project are in this issue



JULY 6, 1931

Rehabilitating a World's Fair building with Revere Sheet Copper



PRIDE of Chicago's World's Fair of 1893 was the Columbian Fine Arts Building. For years after, it stood, a heritage of the Fair, housing the Field Columbian Museum.

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The work of rehabilitation is going forward under the direction of Graham, Anderson, Probst and White, Architects.

In this great work, over 200,000 pounds of Revere Sheet Copper will be used . . . in roofing, flashings, skylights, stampings. Kitzelman

& Co. of Chicago are the sheet metal contractors.

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For over 130 years Revere Sheet Copper has gone into America's great building projects . . . Boston State House, National Capitol at Washington, in many of the buildings in the Grand Central Terminal Zone of New York City, and now the Fine Arts Building.

Such is the prestige of Revere Sheet Copper . . . a prestige founded on quality . . . on performance.

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True Talks

with successful sheet metal men

SERIES No. 1

NUMBER 4



FIRST MONEL METAL JOB...

"ALWAYS SELLS MORE" ... Chas. B. Rundell

37-year-old Indiana firm has installed a wide variety of Monel Metal equipment without a single comeback

After 37 years in the sheet metal business, Chas. B. Rundell of Ft. Wayne, Ind., has reason to know metals and what they're good for. So when he says that he believes Monel Metal holds unlimited future possibilities for sheet metal contractors, you can be sure he knows.

All right—let's listen. Here's his story in his own words:

"I employ only sheet metal mechanics and it is a pleasure for my men to work with Monel Metal. It gives them a chance to show their real ability, for Monel Metal

jobs are outstandingly distinctive.

"It has been our policy for 37 years to give our customers the most up-to-date equipment, and to keep ourselves abreast of the latest developments in metal-work. Constant observation of the trend in new metals confirms

our belief that the future possibilities of Monel Metal are unlimited.

"We have supplied homes, hospitals, laboratories, textile mills, ice cream factories, hotels, restaurants and other institutions with Monel Metal equipment



View of Monel Metal equipment in ice cream plant of Schlosser Bros., Ft. Wayne, Ind. In this modern, spotlessly clean creamery, Monel Metal is used for door and door frames, ice cream freezers, hoppers, chain guard, motor cover, pipes from upper floor and table drawers. All this Monel Metal work built by Chas. B. Rundell, Ft. Wayne.

and we still have to find the first job that has not given entire satisfaction. Moreover, we consider every Monel Metal job we install a permanent advertisement. Your first

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Mr. Rundell is not alone in his enthusiasm for Monel Metal. He has plenty of good company among scores of progressive sheet metal contractors who are turning Monel Metal's remarkable properties and wide adaptability into cold cash. These fabricators report that Monel Metal's modern beauty, rust-immunity, corrosion-resistance, ready cleanability and steel-like strength and durability make a combination that helps them land job after job in the face of stiffest competition!

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The busy sheet metal shop of Chas. B. Rundell, Ft. Wayne, Ind. Mr. Rundell, in the foreground, has been in the sheet metal business in this location since 1888.

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MONEL METAL
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THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

INDEX PAGES—6 and 48

[VOL. 100, No. 14]

BUYERS' DIRECTORY—44 and 46

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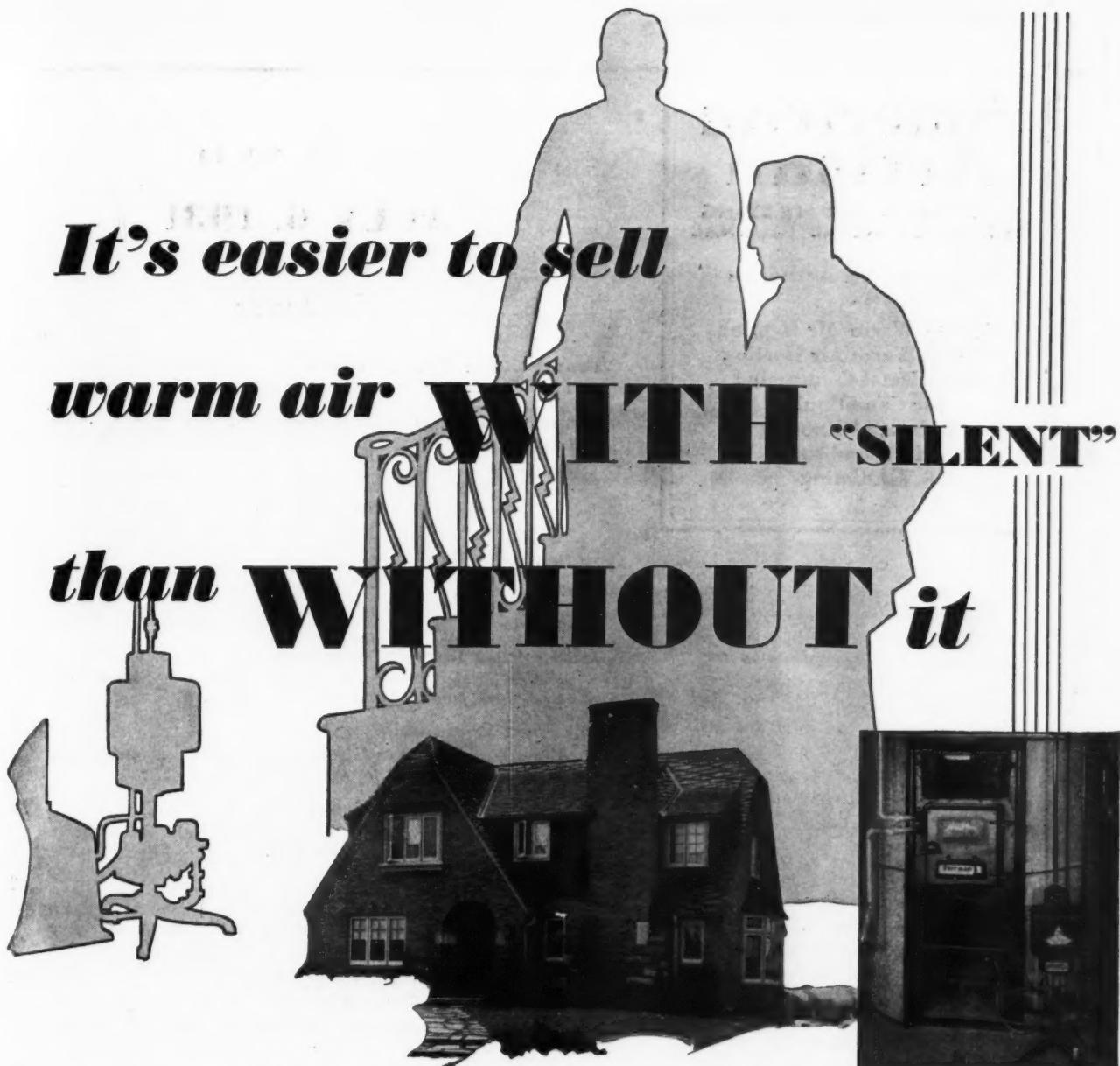
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THE WARM AIR HEATING
AND SHEET METAL JOURNAL

Covering All Activities

IN

Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

VOL. 100, NO. 14

JULY 6, 1931

Contents

Cornelius Clutts is possibly one of the country's leading furnace salesmen. He hasn't been in the game long, but his experiences have multiplied rapidly. If you don't believe he can sell furnaces read this installment and see for yourself. Perhaps you can use some of this brilliant salesman's ideas. Who knows?

If you want some proof that there has been a depression, just take our word for it. Probably the outstanding and almost the only architectural sheet metal job done in New York City this spring was the Waldorf-Astoria Hotel copper domes. The details are in this issue. We are hoping that New York will soon find itself so we can get some more stories.

Due to space limitations last issue we had to leave out such standbys as Voorhees, John, Jordan, Overton, etc. But we try to make up for it this time by publishing articles by most of these men. If possible we won't let the June 22 incident happen again.

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JOSEPH D. WILDER
Editor

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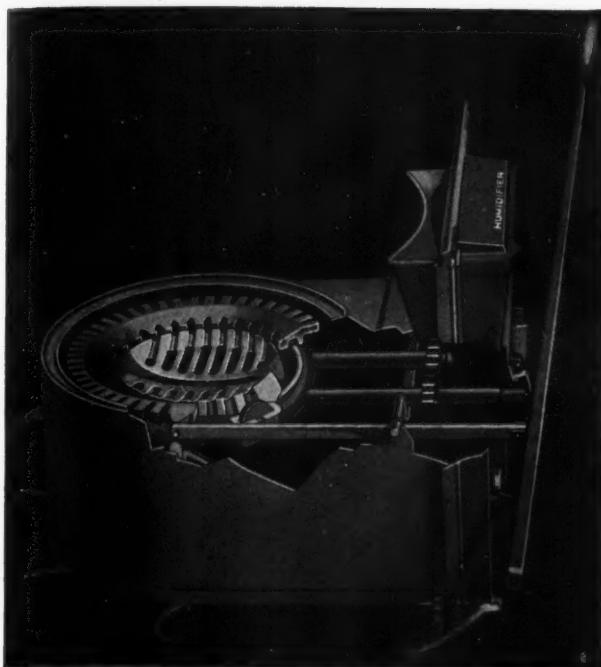
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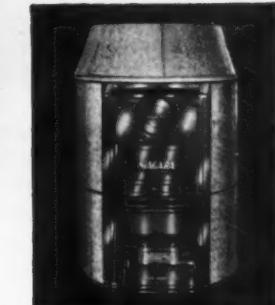
Cleveland, Ohio

HEALTHFUL HEAT

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WARM AIR FURNACE

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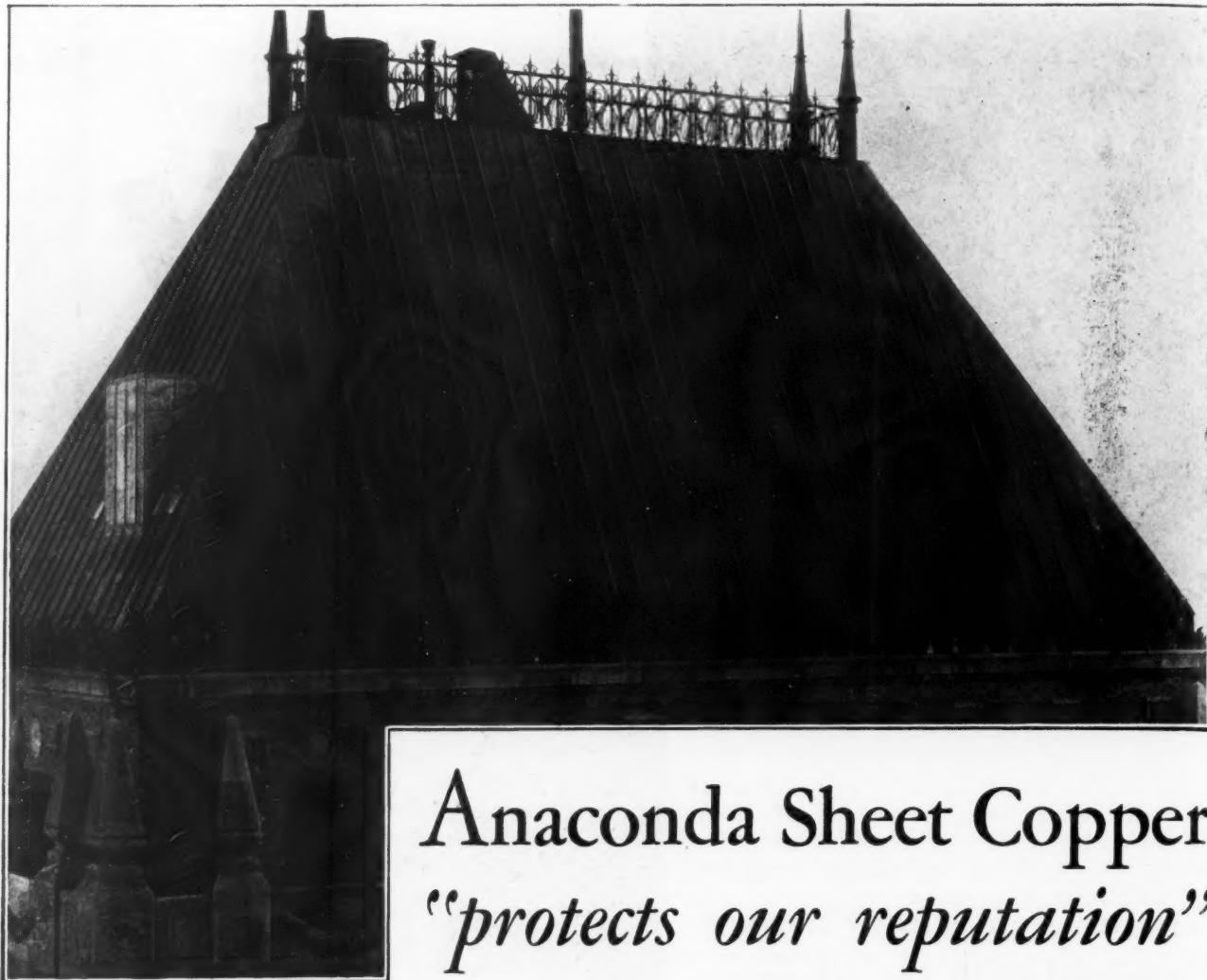


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Anaconda Sheet Copper *"protects our reputation"*

says: **FRANK A. GRACE**

OF HERRMANN AND GRACE
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This trade-mark is stamped in Economy Strip Copper, a convenient product with parallel edges used for the manufacture of gutters and rain-pipes. Look for this identification.

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American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL

Volume 100

Number 14

Your Cake Is Being Nibbled!

IN traveling around the country talking to heating contractors and viewing their latest jobs, we sometimes wonder if they realize what tremendous changes are just ahead of them. Many of our readers are, but many of them seem to be content to go along doing things in the same old way, talking about the same old things to customers, designing and installing as they always have.

Let us quote from the editorial of a leading business paper serving the plumbing and heating field. This editorial says in part—

"The forward-looking heating contractor will, by now, be giving some consideration to the effect of the growing interest in air conditioning in the home on the radiator business. We are, no doubt, moving toward a time when the individual residence owner will enjoy the comfort which will come from the application of controlled warmth and humidity to these smaller buildings. In just what way will the heating contractor, whose whole experience has been in the field of radiator heating, meet this change?

"The problem has two branches. First there is the home in which there is now a boiler. There will be a growing demand on the part of home owners for the kind of air conditioning they enjoy in their local theaters and hotel dining rooms. The other branch of the problem is—by far the greatest number of residential heating plants are of the warm air type. In the story in our last issue, a unit heater, furnished with steam from the district system, has been used. But what of the warm air plant where there is no district steam plant? Who is going to get that work—the sheet metal man who has specialized in warm air heating or the heating contractor whose knowledge lies in the steam, hot water and vapor field?

"One contractor says that if the latter [the steam and water contractor] does not get the necessary information he is going to find a lot of business slipping out of his hands. The observation seems to be a just one. Conditioned air, with the warmth and humidity controlled, is *at the least a combination sheet metal and piping job*. *Our heating contractor (steam and water) has the opportunity to handle this new business, if he prepares himself for it.*"

That statement clearly points out our future problem. An air conditioned job is a combined sheet metal

and piping job. But so, also, must the electrician and the plumber contribute work. Why not give the job to them also?

There seems to be little doubt but that this air conditioned home is going to draw envious eyes from all directions. Secretary of Commerce Lamont recently said, "The next big industrial field is going to be the field of air conditioning the American home."

Undoubtedly we have done a lot of talking and speculating about this air conditioning. The trouble is we haven't put enough effort behind our talk. Unquestionably it is easier to *say* we should sell air conditioning systems than to go out and actually *sell* them, but if we don't do the selling someone else will.

Not more than a month ago a wealthy man living in a suburb of Chicago wanted an air conditioning system in his new \$100,000 home. He got a theater engineering firm from Chicago to put it in because, "I never heard of any local heating man who did such work." Yet there are three good warm air heating men within ten minutes' drive.

He didn't know those contractors did that kind of work, *because those contractors had never thought it necessary to talk to that man or send him mailing matter, or solicitate him on the phone!*

If our contractors don't think enough of their future bread and butter to lay the foundation for it now, undoubtedly some other trade will step in and take the business away from us. They should, for business is not apportioned by grace of God, but by sales effort.

It is a big problem. It contains plenty of room for the combined brains and efforts and money of every person connected with warm air heating. Manufacturers can help by advertising their air conditioning equipment to the public. Certainly there is a large field for association effort.

But the bulk of the effort is going to come from the contractor. He it is who is going out and talk air conditioning. He it is who will use typical jobs to sell others. He it is who will have to advertise his ability and service and *sell* the equipment. He it is who is going to do the telephone solicitation, door to door canvassing, and direct mail work. And above all, he it is who is going to sell the idea to architects and do the installing.

SHEET COPPER ORNAMENTS TWIN TOWERS OF WALDORF-ASTORIA

The Dignified New Structure of the Famous New York City Hotel Uses Forty Tons of Copper for Tower Sheathing and Unique Floor Protection

HERE will be opened to the traveling public of the world this fall, a new and greatly enlarged Waldorf-Astoria Hotel. To New Yorker's and visitors alike the hotel's opening will recall memories of days when the old Waldorf with its dining rooms and social events was one of the hubs around which New York City revolved.

The new hotel covers an entire block. Light and air are insured by the deep light courts which break the outside facings and by the setback type of architecture. Above the huge lower block of the building there is a magnificent tower rising high above the surrounding buildings. This main tower is ornamented by twin towers which house at their peak ornamental lanterns of huge dimensions.

It is on the domes of these towers that thousands of pounds of Revere copper and considerable aluminum were used as sheathing.

The new hotel is farther up town for on the site of the old hotel there now stands the world's tallest structure—the Empire State Building. Just as the old hotel was one of the finest buildings of its time, so the new hostelry will be one of the most magnificent buildings of the

world's second city. Throughout the new building no detail has been held too small to warrant the expenditure of sufficient time and thought to make that detail conform to the highest architectural and construction practices.

In keeping with this idea of per-

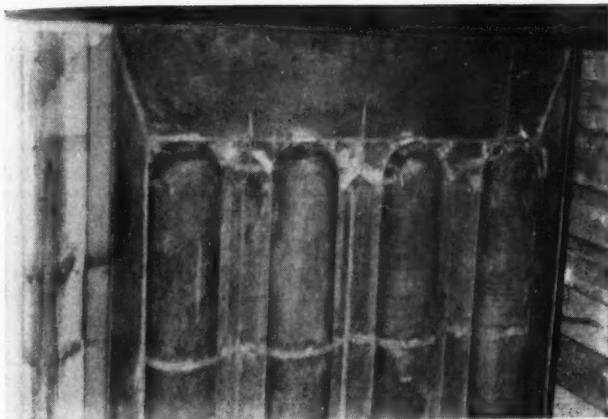


Above is a closeup of one of the wing tips, showing the formation of the copper sheets. The seams of the section are clearly indicated. The wood backup also shows. This is the topmost wing

Left is a view showing the copper sheathing on the slopes of the dome. The sections are all single locked, unsoldered. The moldings are all soldered to the slope copper



manence, beauty and service much thought was given to the finishing off of the twin towers which rise high above the lower levels and the tower of the building. Two requisites were demanded of the materials sheathing the towers—a permanence equal to the remainder of the exterior and a beauty conform-



Left is one of the special panels. These panels were all assembled in the shop and erected as a complete unit on wood backup

At the right is a cross section of the dome, showing the insulating layer, the slope sheathing and the construction of the wings. The lantern stands above this

ing with the building and its furnishings. Copper was selected as the material most in keeping with the coloring of the exterior and the permanence demanded.

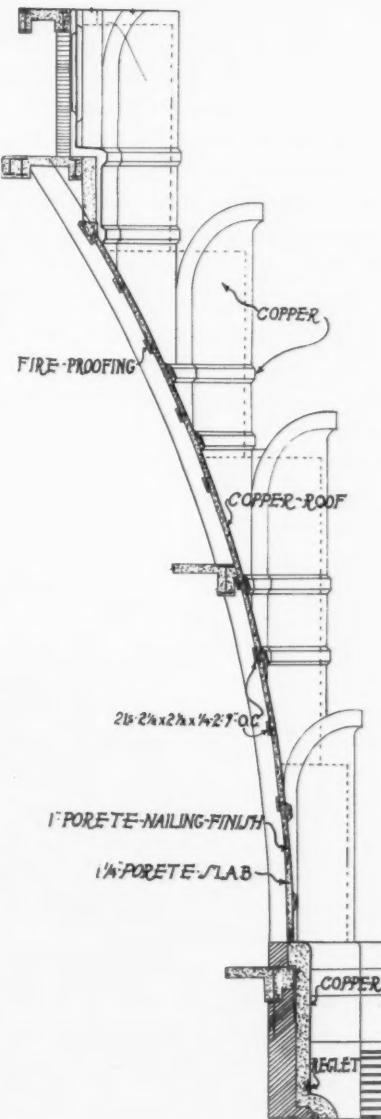
This copper contract was awarded to Benjamin Reisner, sheet metal contractor of New York, who was also the contractor for the Chrysler Building. A separate contract covered the erection of aluminum spandrels under the windows of the base structure. These spandrels are all cast aluminum of a design prepared especially for the hotel. This contract was completed months before work on the other metal was begun.

More than 80,000 pounds of copper were required to sheath the towers, cover the hatchways and decks of the various roofs and for flashing. Much of this copper was

fabricated into interesting molding courses and for special wings and panels which provide the ornamentation. An explanation of the fabrication followed on one of the towers is typical for both.

The copper contract begins at the bottom of the slope of the tower domes. Roughly, the copper follows the form of moulding panels alternated by higher courses of plain flat copper sheeting. This part of the dome is topped by a wide moulding course on which stands the lantern housing. Along both axis of the dome there is a projecting ornamentation of four setback wings one on top of the other and following the contour of the dome.

The structural framework supports a layer of Porete, a light weight insulating material. This



was insulated from the copper by paper. For all the ornamental wings and copper panels suitable wood framing was provided to fasten the copper. Some of the cross section details show how this backup material supports the copper.

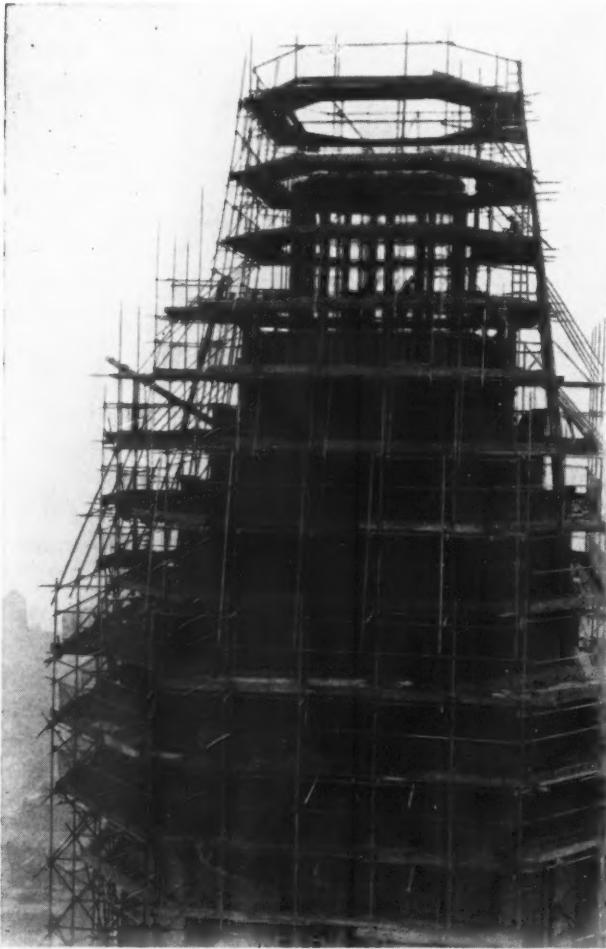
The moulding courses were fabricated in the contractor's shop and shipped to the job in sections which were then anchored in place and soldered. Each section of the moulding consisted of the top and bottom belt courses with the in-between panel. This panel is composed of triangular V-sections running from the top belt to the lower and forming a triangular panel between each pair. The back panel is again formed as a triangular pyramid with the apex projecting out as far as the cross bars.



This is the first full course of copper. The top of the masonry is protected by a copper sheet waterproofed as shown. The first belt molding also shows

The ends of the cross bars were all soldered to the top and bottom belt courses and the pyramid panels are soldered top and bottom to the belt courses and along the sides to the cross bars. The junction of these panels with the flat sheathed courses on the dome is also soldered. These ornamental belt courses are 4 feet high. The time required to form and assemble all the sections of copper required for the large girth of the dome can be appreciated from the photographs.

The fabrication and erection of

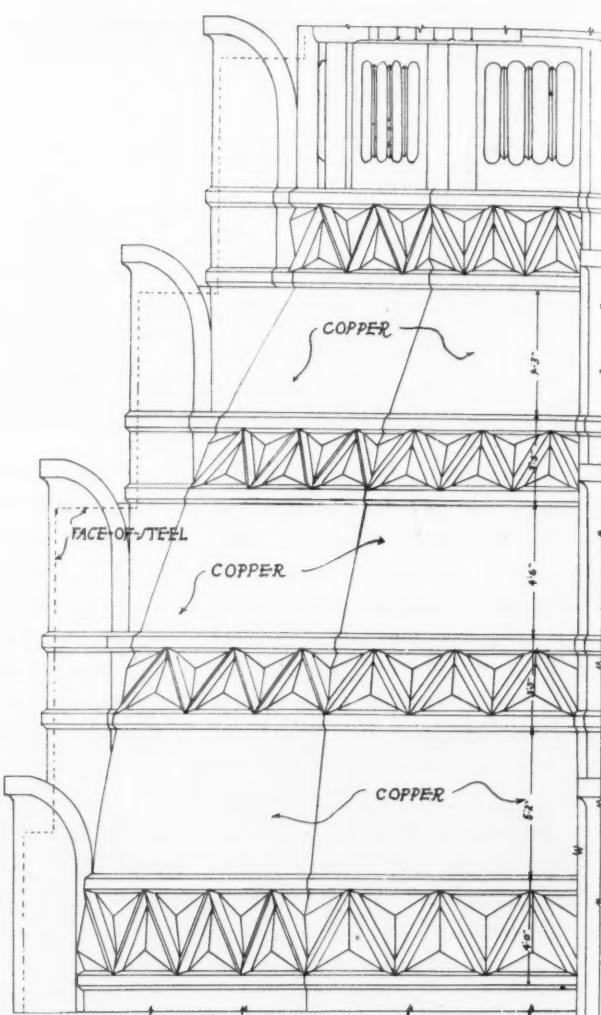


the flat sheeting on the dome slopes is plain loose lock seams on rectangular sheets. The long axis of the sheets runs around the dome. The sheets were formed with a back side lock on the bottom and right side and a top side lock on the top and left side. The sheets were assembled around the dome according to this seaming.

This section of the work, aside from the shop fabrication for the panels, entailed only ordinary erec-

tion, but the ornamental panels which form the wings and the bottom course following the stone and the top course below the lanterns required much soldering and considerable more intricate fabrication and erection.

The ornamental flat panels were formed from molds sculptured for the tower. The basic design is shown in one of the photographs and consists of four wide rolled vertical sections between flat panels



New York contractors use a pipe and fireproofed board scaffolding since several expensive and dangerous fires have occurred on scaffolds. This is the Riesner scaffolding on the east tower. The men are working on the lantern

and surrounded by flat edges which meet the back edge of the wings and the copper of the courses adjacent.

One photograph shows how these panels were fabricated as small units and soldered together. A similar design was used for the vertical buttresses which form the base for each set back of a wing. On these buttresses, however, the panels of rounded sections was completed top and bottom with projecting mouldings.

The setback wings which face north, south, east and west are the featured ornamentation of the towers. These wings stand on high pedestals, already described. The wings are so designed that the outside face is vertical, but the back edge turns down in a sweeping arc to meet the foot of the pedestal of the wing above. The stamped panels of the wings sweep in the reverse direction at the top. How the wings were sectionized shows

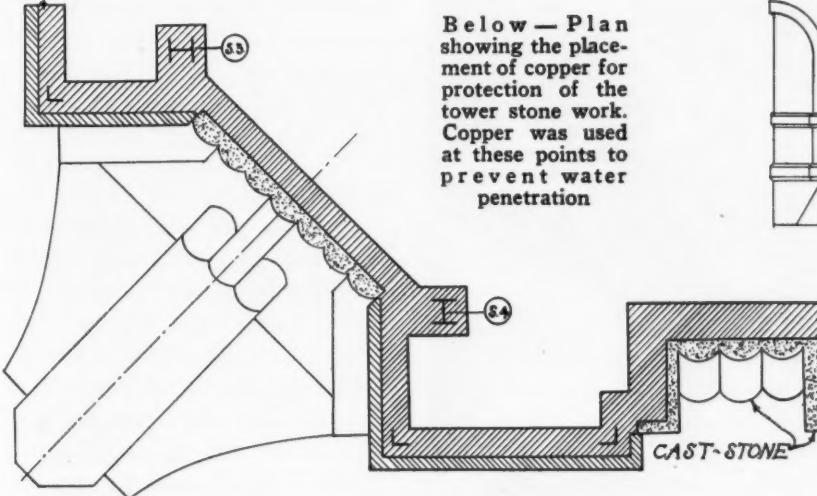


Left—A view showing some of the miscellaneous copper work on the building

Below—Elevation of the lantern. The drawing shows where the division between aluminum and copper occurs. The panels will all the glass held in aluminum frames

clearly on one or two of the photographs.

Both the panels and the wings are supported on wood backup sup-



ported in turn on the structural frame.

The lantern housing which finishes off the tower is glass and aluminum. The architectural motif is a continuation of the fluted panels and wings of the main dome below. At the level of the topmost wing there is a wide belt course of the

Below—Plan showing the placement of copper for protection of the tower stone work. Copper was used at these points to prevent water penetration

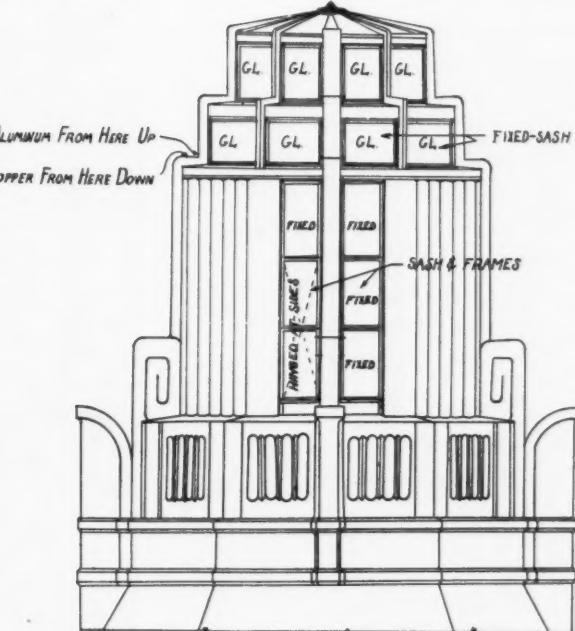
fluted copper panels forming an eight sided base for the housing proper. The top of this base is a flat sloped deck of copper and from this deck rises the higher fluted panels of copper with narrow glass panels set into the copper panels. The glass frame here is aluminum.

Above this section is the alu-

minum and glass lantern. As much of the surface of the lantern as possible is glass, with the panes held between vertical mullions of aluminum and flat battens of the same material. There are two setback vertical surfaces to the lantern and on top a flat sloped roof of glass held between radiating aluminum battens. The construction used is shown in one of the detail sketches.

There is several hundred feet of copper flashing used on the setback roofs. This was all standard two piece flashing. In addition considerable copper went into the deck roofs, hatchways, and ventilators which are located on the various roofs.

One of the most interesting features of the Riesner contract was



the use of copper waterproofing for all the bathroom floors throughout the hotel. The bathrooms are finished in tile, but in order to make certain that no water penetration might spoil decoration, each tile floor is underlaid with a copper pan which has sides running up the walls to a point above which water will never stand even though the drains clog. These waterproof floors consist of a flat floor sheet with the four edges turned up and soldered tight.

In addition a similar waterproofing was used on all kitchen floors

(Continued on page 26)

So Sez CORNELIUS—

Fire-O City, Mich.,
Sept. 15, 1930.

Mr. Cornelius Clutts,
Spring Valley, Iowa.
Dear Mr. Clutts:

Welcome to our happy family! It gives me the greatest pleasure, Mr. Clutts, to greet you as the newest member of our large, loyal and ever growing group of contented Fire-O Furnace Dealers. I am quite sure that the exclusive dealership which you have acquired for the city of Spring Valley will prove the turning point in your life. We are expecting great things of you, Mr. Clutts, and you may rest assured of ample reward in the form of handsome profits and fast friends made through the sale of Fire-O Furnaces.

I am, with all best wishes,
Yours sincerely,
Thomas Blattmore, President,
Fire-O Furnace Co.

* * *

Spring Valley, Iowa,
Sept. 21, 1930.

Mr. Thomas Blattmore, Pres.,
Fire-O Furnace Co.,
Fire-O-City, Mich.

Dear Sir:

I received your letter, also the furnace which I ordered for my showroom. I don't know exactly what you mean by the turning point in my life, but I believe you are a little bit late. The turning point was several years ago when I married my wife. I have been turning more or less ever since. I am at present thinking over several good ideas and when I pick out the best one expect to have something good to report. In the meantime, I am,

Yours truly,
Cornelius Clutts.



"I wish I could have seen him when he got your letter saying I was your new dealer."

Fire-O City, Mich.,
Oct. 1, 1930.

Mr. Cornelius Clutts,
Spring Valley, Iowa.
Dear Mr. Clutts:

Mr. James MacDonald of near your city has recently made inquiry regarding the Fire-O Furnace. He apparently is particularly interested in the Excello-O No. 1 Model, which as you know is our lowest priced product. We have written him at length, sending along one of our beautiful folders, and have also informed Mr. MacDonald that you are our exclusive dealer in Spring Valley. I trust that you will call on this prospect at an early date, and that you will be successful in convincing him that the Fire-O is the furnace he needs.

Yours sincerely,
Stafford Starrett, Sales M.,
Fire-O Furnace Co.

* * *

Spring Valley, Iowa,
Oct. 10, 1930.

Mr. Stafford Starrett, Sales M.,
Fire-O Furnace Co.,
Fire-O City, Mich.

Dear Sir:

I know you will be surprised, but I can't say that I was delighted to receive your letter informing me that old man—that Mr. Jas. MacDonald—wanted to buy a furnace. Of course, he would pick out the cheapest one. It is one of these cruel twists of fate, I guess, that "Scotty" MacDonald turns out to be my first prospect. I wish I could have seen him when he received your letter. If he wasn't so tight I would say that he just about blew up when you told him about me selling the Fire-O Furnace in Spring Valley.

You see, me and Scotty are not on very good terms, not that we

don't speak or anything, but just sort of say "howdy" when we meet and that's all. It all happened about two years ago last May.

My uncle, who used to run the old mill on the edge of town, died and left the property to me. The mill hadn't been run for some time so I just let it stand without doing anything about it. The mill dam was still there and everything. Old man MacDonald owns the property, about ten acres, next to my uncle's and adjoining it directly below the dam. I remember it as well as yesterday when the big rain storm came and washed out the old dam. The water poured all over Scotty's hog lot, about two feet deep, and before he could get them out to higher ground, about a dozen of his hogs were drowned. At least he claimed they were, although the boys down at the barber shop told some kind of a story about them dying for lack of sleep. Jim Patterson, one of the boys who never amounted to much, explained that the hogs waded around in the mud until they were covered with it, and then when they got out in the sun and dried off the mud caked and pulled their hides so they couldn't close their eyes. They went on like this for two or three days and then died for want of sleep. Of course, I laughed with Jim but when old man MacDonald heard it, he got madder than ever. So ever since that time, he has had it in for me although, as you see, I wasn't to blame.

Yours truly,
Cornelius Clutts.
* * *
Fire-O City, Iowa,
October 13, 1930.

Mr. Cornelius Clutts,
Spring Valley, Iowa.
Dear Mr. Clutts:

There is one thing our dealers never do. That is to think of a prospect as "tough" until they have gone out and sold him. You must remember, Mr. Clutts, that you are no longer simply Mr. Clutts of Spring Valley, Iowa, but Cornelius Clutts, Exclusive Dealer for Fire-O Furnaces.

You are now one of that great fraternity—"Purveyors of comfort to the American public."

Now, Mr. Clutts, remember you are backed by one of the largest and best known manufacturers in the country. Regardless of your personal differences with Mr. MacDonald you now are a salesman for a product every home owner wants and needs.

Remember this, Mr. Clutts, and go out and sell him.

Yours sincerely,
Stafford Starrett, Sales Mgr.,
Fire-O Furnace Co.
* * *



"The sun caked the mud so they couldn't shut their eyes and they died for lack of sleep."

Spring Valley, Iowa,
Oct. 17, 1930.

Mr. Stafford Starrett, Sales Mgr.,
Fire-O Furnace Co.,
Fire-O City, Mich.

Dear Sir:

You probably will be surprised at hearing that on my first attempt I made a sale of one Fire-O Furnace. Well, it was a sale, but not to the person you may think it was to.

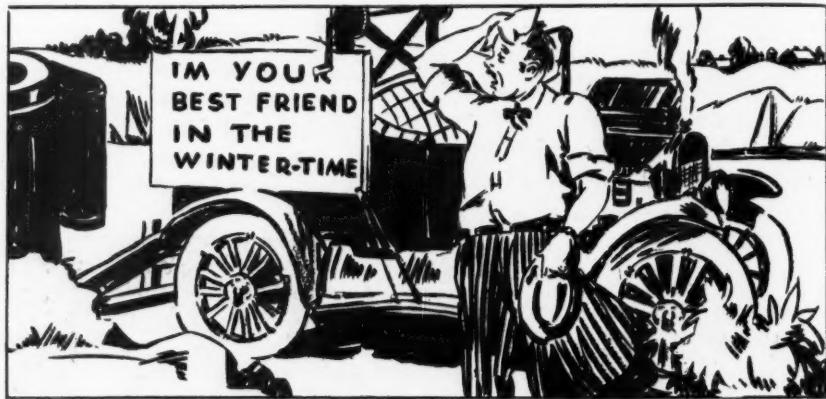
To give you an idea of the deal and my ingenuity, I will explain. When I got your letter I got busy right away. I was stumped for a minute but as usual quickly doped out a plan to go about making the sale. You see, Scotty has a lot of curiosity, always poking his nose in

things, and is the first one around when anything happens or there is something out of the ordinary to see. I got Joe Palmer, the blacksmith, to help me rig up a contraption so I could hoist the furnace up on the back of my flivver truck. I figured out a slide so that when the furnace was tilted a little, it could be slid off easy when I wanted to take it off. Well, to make a long story short, I put the furnace on the back of the truck and nailed up a big banner with words on it, "I'm your best friend in the winter time." This was on a Wednesday afternoon. The next morning I planned to drive out by Scotty's place and "accidentally" stall the truck right in front of his house. While I was pretending to fix the truck, I knew that old Scotty, if he was around, would let his curiosity get the best of him and come out to see what was on the truck. I figured on just letting him look around awhile without me saying anything, and that sooner or later he would start asking questions and then I would gradually ease into my sales talk. So I loosened a wire on the motor to make it easy to yank off at the proper moment. The next day, Thursday, I started out about ten o'clock. It's about four miles to Scotty's place, so I drove slow and easy so as not to shake up the furnace. Everything went fine until I got about two miles out on the road when all of a sudden the truck stopped, just like that. Just a couple of wheezes and then she died. I figured that maybe the wire was too loose and had come off by itself. So I got down from the driver's seat and looked over the wiring but it appeared to be all O. K. Then I looked in the gas tank but it was full, and after first inspecting this jigger and that one, and finding nothing wrong, decided that maybe the weight of the furnace on the truck had caused something to go haywire. I clambered up on back and started prying around. Somehow or other, I don't know exactly just what I did, but anyway by some hook or crook, I released the tilting apparatus and

first thing I knew up come the furnace. Without any hesitation at all it started a slow descent down the skids which I had made for the purpose of unloading. I tugged and pulled back but to no avail for she kept right on her way and in the time it takes to tell it, came to rest gently and easily on the ground. So there I was, first with a broken down truck, and then with a perfectly good furnace setting alongside the road. I emitted a few choice phrases, wiped the sweat from my brow, and attempted to pull myself together so as to be able to meet the situation. Right then, for the first time, I noticed that I was almost directly in front of Abel Smith's house, which sets back from the road about sixty feet. Well, I thought, I will call on Abel for help. It was about a quarter of eleven by this time so I figured he would most likely be about the barn, which was located on the opposite side of the road, or else in the field back of the barn. So I crossed over to the barn, and seeing no one around, went in back, out of sight of the truck, and looked in the cow pasture. I spent a few minutes, maybe fifteen or twenty, in trying to locate Abel, but being unable to find him, started to retrace my steps to the truck. I approached the road and was just going to open the barn lot gate when my gaze, wandering toward the truck, failed to see the furnace. It should have been in plain view from where I stood, but no sir, she wasn't there. I hurried over, and you can strike me dead, if that furnace hadn't disappeared, just like the earth had opened and swallowed it. I rubbed my eyes and looked again, but there was no furnace, nothing but a round place in the soft ground where it had stood. I was sure enough stumped then, and started at a dog trot up to the house. I rapped on the front door and after waiting it seemed like ages, heard someone approaching. When the door opened, a total stranger confronted me. "I was looking for Abel," I began, "you see my truck broke down, then the furnace disappeared and—" "Excuse

me," the stranger interrupted, "evidently you have not heard about it, but I bought out Abel two days ago and am moving in today. The trade was made rather suddenly, and as I wanted immediate possession, Abel agreed to move out at once. My name is Felix Thompson, and if you will go on with your story, I'll be glad to help you if I can." I ex-

thought up to this time. I intend to make some improvements to the property, and among them was considering installing a central heating plant. Now that you are here, and the furnace is here, maybe we can talk business." For the second I was hard put to find words, but managed to launch into a good sales talk and before I finished had



"By some hook or crook I released the tilting apparatus and there I was with a broken down truck and my furnace setting alongside in the road."

plained about the truck, and the furnace disappearing, and when I finished, I thought I could see a sort of smile creeping over his countenance. "Indeed," he said, "that is most extraordinary. But maybe we can solve the mystery of the disappearing furnace. Let's go around in back and see if the boys who are helping me move know anything about it." So we proceeded to the back of the house, and when I stepped out on the back porch, the first thing I saw was the furnace setting there as big as life. Three husky fellows were unloading some other stuff from a big truck, and when Mr. Thompson spoke to one of them the fellow said, yes, they moved the furnace, thinking it had been delivered and ought to be brought in to the house. I certainly was relieved to see the furnace again, and proceeded to tell Mr. Thompson about my starting out to Scotty MacDonald's place where I hoped to make a sale. He stood silent for a moment, stroking his chin, then spoke up suddenly. "Well, this certainly is a coincidence. You know, I have been figuring on buying a furnace, but really hadn't given the matter much

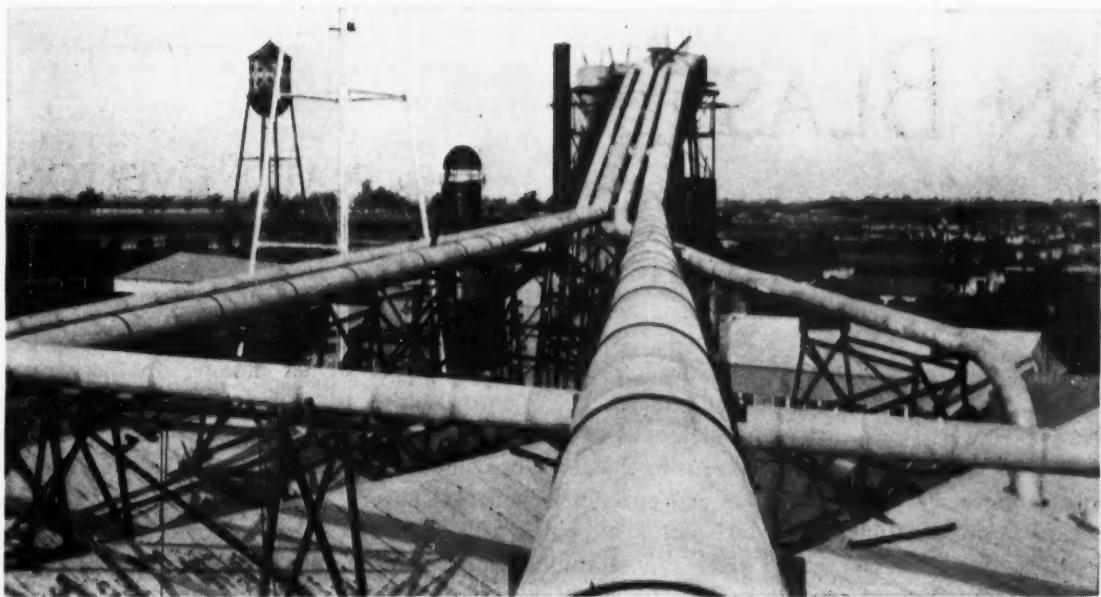
warmed up to the situation in splendid fashion. I concluded with a grand flourish, and Mr. Thompson spoke up immediately. "Regardless of what you said, I still believe your furnace is a good one. The name isn't new to me, and I have heard good reports about it. I make up my mind in a hurry, and have decided to buy the furnace from you. Suppose I come in town tomorrow and we will complete the transaction. I will give you my check at that time, and we can arrange about the installation." "That's fine, Mr. Thompson," I said in a very business like manner. "Now if one of your men will come out and help me with the truck, I will be on my way back to town." So with that, one of the movers went out to the truck, and while I sat in the driver's seat, he gave the crank a quick spin. Again, I could hardly believe myself, when the motor started off instantly, with no trouble at all.

Pretty good sale, wasn't it?

Yours truly,

Cornelius Clutts.

P. S.: My wife will just about pass out when she hears that Abel Smith has up and moved without her knowing a thing about it.



This is the overhead system just before it rises to the collectors

A California Blow Pipe System

By J. EDW. TUFT

THE blow pipe system installed for the Pacific Manufacturing Company, at Santa Clara, California, by W. C. Taylor, sheet metal contractor, Pasadena, Cal., is one of the largest systems of the kind on the Pacific coast and probably contains as large an amount of sheet metal as any door and sash factory has put into a modern blow-

pipe system west of the Rocky Mountains.

The main discharge pipes above the building carry the shavings, sawdust, etc., to the boilers where these materials are used as fuel and are four in number. The largest one is 43 inches in diameter, the second one is 33 inches, the third one is 31 inches and the fourth one

25 inches.

The pipe of major size in this installation is more than two hundred feet long. At the point where the collector is located the pipe attains an altitude of eighty feet.

Refuse is received from a large number of fans. A general pick-up of saw-dust and shavings is made by a Number 100 Buffalo forge, slow speed, driven by a 100 horsepower motor. There are also two Number 80 fans of the same make picking up from the saws and stickers, each driven by a 40 horsepower motor. There are two Number 60 fans, one picking up from the matcher, and a Number 50, each driven by a 40 horsepower motor.

The refuse is relayed along the way by being caught in sub-collectors and finally furnishes a good portion of the fuel used in the boilers.

The entire sheet metal job was done by Mr. Taylor's force, fifteen men working for five months to complete it. Not only the blowpipes but the collectors were included in the job.



Some of the pipe sections used in the system

FAN BLAST ENGINEERING

By PLATTE OVERTON
Heating Engineer

We will now turn our attention to the selection of the fan or blower. Our data sheet calls for 16,639 c.f.m. at 120 degrees and as explained in the issue of *AMERICAN ARTISAN*, June 1st, the fan will handle air from the outside with a mean temperature of 40 degrees. In volume our fan will handle 14,200 c.f.m. approximately.

The air to the fan will vary in temperature, as the weather varies, and in extremely cold weather more air will be delivered. This will cause the pressures to vary, but not enough to jeopardize the successful performance of the installation. The cross section shows the fan as it will sit when installed. The air is blown down and this type of fan is known as a seven-eighth housed, bottom horizontal discharge. It is

single width, single inlet with overhung pulley.

Various types of discharge are shown on the accompanying drawing and our fan is same as shown as No 2. The rotation will be clockwise. We determine the clockwise or counter-clockwise rotation by standing facing the pulley.

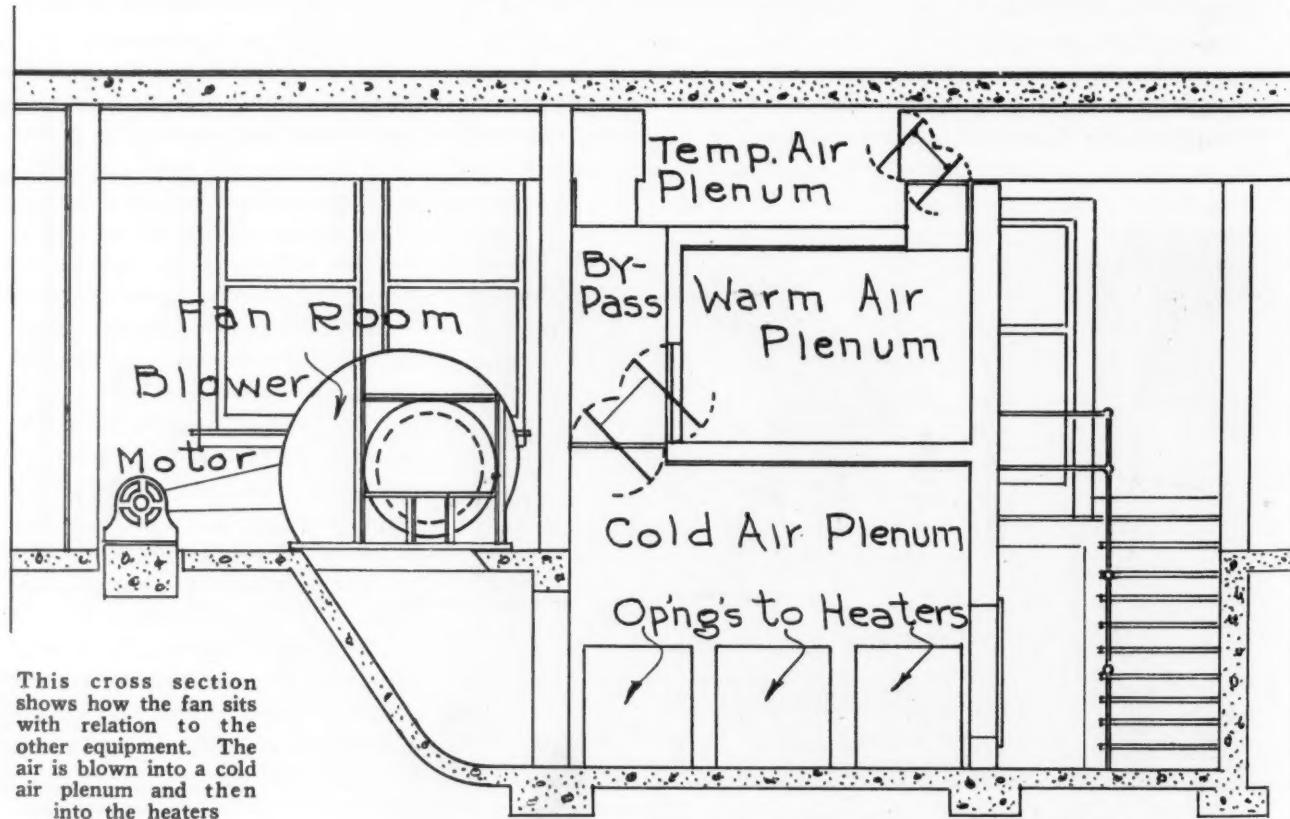
Many books have been written on various types of fan and blowers and their performances, and it is not our intention to discuss this data. The engineer or contractor is safe in the selection of any standard fan, rated and tested according to the A. S. H. & V. E. code. The various data or fan performance may be obtained from the manufacturers' catalogs.

Our outlet velocity at the fan discharge must not exceed 2,000 feet

per minute. In factory or garage installations where noise is not objectionable, outlet velocities may run as high as 2,500 to 2,700 feet per minute at the fan discharge. Two thousand feet per minute is a maximum in schools or theaters. In churches, lodge halls and residences discharge velocities should not exceed 1,600 feet per minute.

Our static loss will be $\frac{1}{2}$ inch (future article), hence we choose a fan to deliver 14,200 c.f.m. at $\frac{1}{2}$ -in. static pressure.

The fan performance data as shown here is taken from the catalog of the manufacturer, and shows our requirement. [It might be mentioned here that while our outlet velocity might be higher, the next size smaller fan had an outlet velocity of 2,200 feet per minute.]



Courtesy New York Blower Company
Capacity Table for No. 45 Type ME Fan

Wheel Diameter 45 Inches
 Wheel Circumference 11.75 Ft.

Volume Cu. Ft. per Minute	Outlet Velocity Ft. per Minute	Add for Total Pres.	1/8" S. P.				1/4" S. P.				1/2" S. P.				1" S. P.				1 1/4" S. P.				1 1/2" S. P.				2" S. P.				2 1/4" S. P.				2 1/2" S. P.				3" S. P.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Fresh Air for Locker Rooms

A Discussion of Locker Ventilation Requirements and Practices with Suggestions on How to Design and Choose the Necessary Equipment

ONE has only to read building reports to realize how rapid is the growth of sports buildings construction. Back yard baseball and football must now be conducted in stadia of dimensions that outRoman the Romans. Pasture golf wherein players dressed and undressed in old barns has given way to country clubs of huge dimensions. And with such buildings there comes an excellent opportunity for warm air and sheet metal contractors to equip locker rooms with ventilating apparatus.

Unless properly supplied with fresh air, the average locker room is quite likely to be offensive on account of perspiration odors. Perspiration, being largely of a chemical nature, not only offends the nose but destroys and discolors clothing unless it has been absorbed by positive air circulation.

The old method of ventilation was by the uncertain procedure of the open window. While this may be feasible in July and August and when there is a fair wind blowing in the right direction, there are serious objections to it throughout the other months of the year.

By ROBERT C. NASON

The prevailing winds, for example, may be in the wrong direction; they may drive the odors from the locker rooms inward rather than outward. In spring, fall and winter open windows are certain to chill such rooms below the safety point by extracting the heat along with the smells.

Artificial ventilation of locker rooms permits several good methods. Cheapest of these, perhaps, is the roof ventilator. When the rooms to be ventilated are on an upper floor the natural vents may be pressed into service without hesitancy.

Locker rooms are, however, more often in basements or lower floors and this may preclude the natural ventilator. In this case the cheapest mechanical equipment to install is the familiar electric propeller, or disc fan.

Fig. 1 shows a typical locker room and an exhaust fan properly installed in a wall and located about 7 feet above the floor. The success of this type of arrangement involves the closure of apertures in

the immediate vicinity of the fan to prevent short circuiting of the air exhausted. The best place for the entrance of the fresh air to replace that withdrawn is at the opposite end of the room.

If the mechanical ventilating system is to be operated over 10 months of the year a gentle, rather than a strong, air current through the room is preferred, due to the danger of chilling. This would apply especially to northern states where the warm season is relatively short.

An air change every 12 minutes usually is adequate and rarely may this be greater than once every 8 minutes except in summer. The fan size to effect this is readily estimated by dividing the cubical contents of the room by 12, for a 12 minute air change, or by 8 for an 8-minute air change. The result is the number of cubic feet of air to be exhausted by the fan or ventilators per minute.

The most comprehensive plan of ventilation for locker rooms is the connection of 3-inch branch pipes to the tops or backs near the tops of individual lockers. These, in

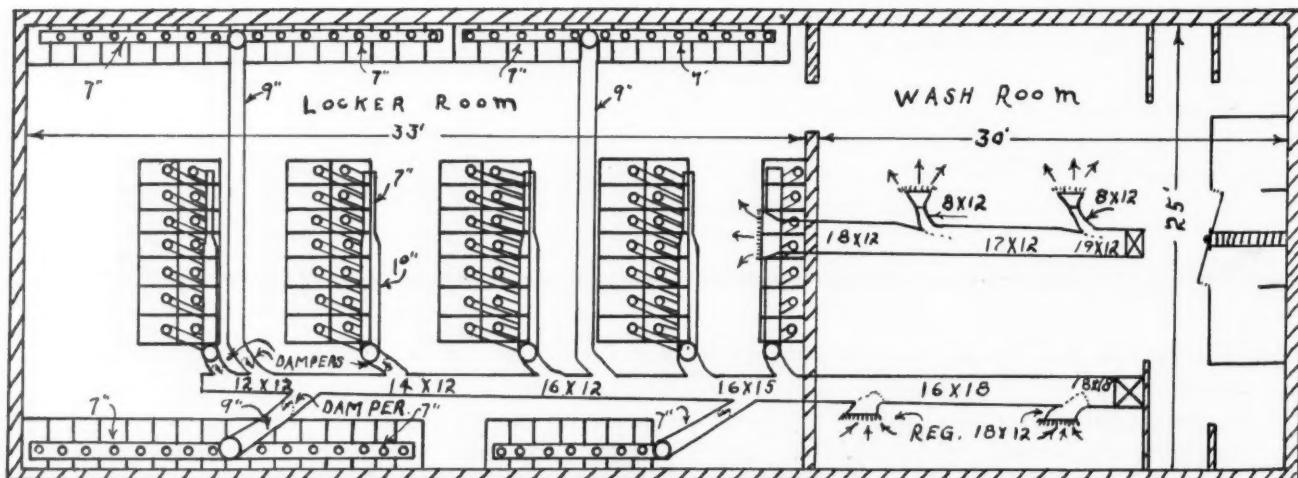


Fig. 1. Layout of a typical locker room assembly with a mechanical ventilating system installed. Every locker is tapped into the ducts through an individual pipe. Room air is withdrawn through open faces

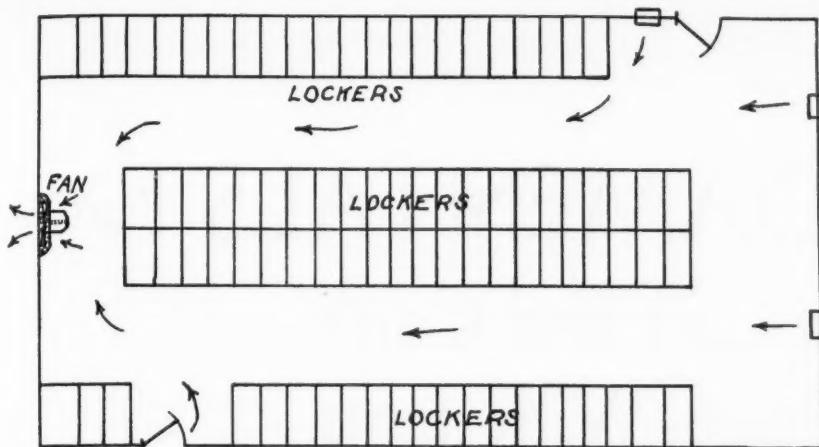


Fig. 2. This room uses wall and center space for the lockers. One fan placed in the center of one end withdraws room air, but cannot be depended on to thoroughly ventilate the lockers

turn, are joined to a main duct that connects to the inlet of a centrifugal fan. Such a system represents the most approved and most effective plan.

The same arrangement may be applied to ventilating any group of small rooms such, for instance, as telephone booths, radio demonstration rooms, photographic dark rooms, theatre dressing rooms and many similar small room groups. In the layout offered as Fig. 2 one observes that lockers are placed in the center, also along the side walls. Each has its own 3-inch branch duct.

Attention is also called to the wash room adjoining the locker room. Both rooms should have a fresh air supply as well as an exhaust system. A portion of the fresh air duct is shown in Fig. 2, the air being delivered to both rooms, while the damp odors from hanging clothing are exhausted through the small branches and delivered outdoors. Two openings in the exhaust main in the wash room, with grilles over them, supplement the locker suction through the individual branches. Louvres in the bottoms of the locker doors provide circulation through each.

Successful exhaust of locker odors demands a fairly rapid current of air through them. Most any sort of stream will, it is true, carry off the ordinary impurities and dry the clothing but to do the job thoroughly requires about three air changes per minute through each

locker. On this basis the 107 lockers shown should have 20 cu. ft. min. through each, or a total of 2,140 cu. ft. min. for all.

Circulation of air, rather than odor exhaust, is required for wash rooms, hence 960 cu. ft. min. is adequate for the wash room shown in the sketch. The total capacity of the exhaust fan, therefore, is 3,100 cu. ft. min.

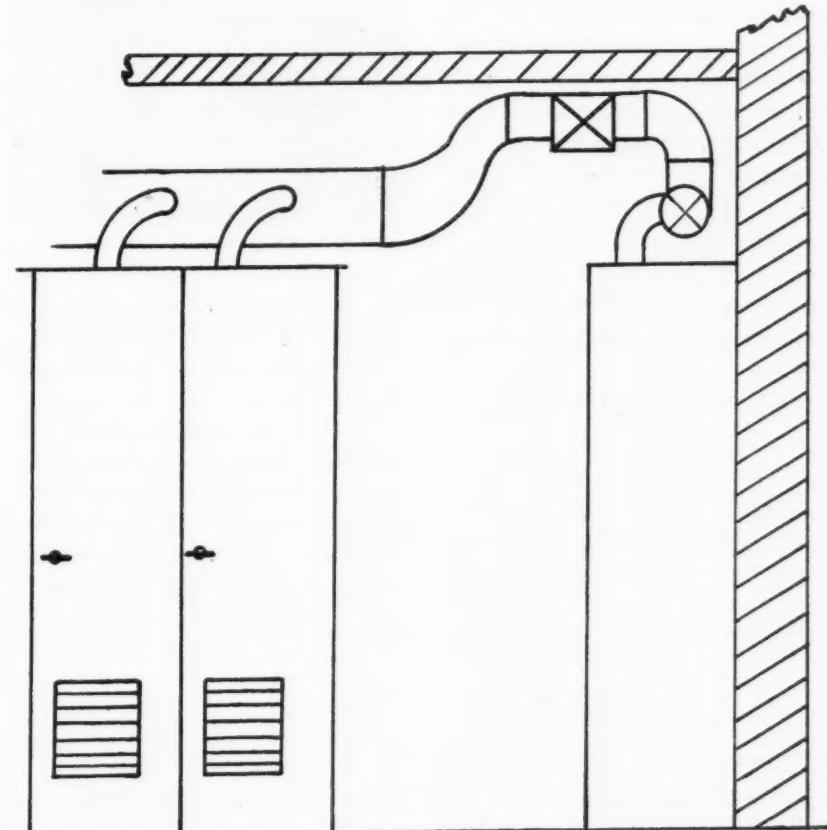
One of the common errors in de-

signing exhaust systems is connection of branches to the bottoms of mains rather than to their sides. How many times, too, does one see branches joining mains at 90 degrees. The better way is to connect branches to the sides of mains and at 45 deg. in the direction of air flow. How this is done in the condition under discussion is shown in Fig. 3.

Physical appearances in factory installations need not be catered to as carefully as in country clubs. Workmen are glad to receive the benefits of fresh air without regard to appearance. On the contrary members of country clubs view their accommodations with considerable pride. Literally thousands of businessmen think, talk and dream about their golf the year around.

On this account country club ducts must be concealed whenever possible. In ventilating the locker rooms shown the branches might have been connected to the backs of the lockers rather than to their tops

(Continued on page 30)



Detail of connection between lockers and exhaust duct in the system where every locker is mechanically ventilated. Air is drawn into the locker through the door louvers

APPLIED FAN FUNDAMENTALS [Part V]

What Can and Can't Be Done With Fans

AS has been previously explained, the quantity of warm air (expressed usually in cubic feet per minute) that must be supplied to a given room to offset the heat loss of the room and maintain the desired temperature, is determined by (1) the heat requirement of the room in B.t.u. per hour and (2) the temperature at which the heated air is delivered.

This fact must be clearly understood to avoid confusion and guard against unsatisfactory fan system operation. There are "thumb rules" for determining the number of cubic feet of air per minute to deliver to a given room and, if used with judgment by one who has had sufficient experience in fan heating, such rules can be made to yield good results. But any heating contractor to whom fan heating is relatively new, should be extremely careful about departing from the more accurate and basically correct rules.

One common thumb rule, for instance, is to provide for four recirculations per hour. This seems to be based on the reasonably correct assumption that in the average gravity plant installed according to the Standard Code, the air recirculates about three times per hour and that a fan system should increase this about $33\frac{1}{3}$ per cent. (Circular 15, University of Illinois, Engineering Experiment Station, a reprint of which can be obtained from the National Warm Aid Heating Association, shows that the heating plant in the Research Residence in

By G. A. VOORHEES

Heating and Ventilating Engineer,
Indianapolis, Ind.



G. A. Voorhees

zero weather, recirculated the air of the building at the rate of 2.93 recirculations per hour.)

To show the results obtained by applying this common thumb rule, let us assume that a given building has two rooms each 12 ft. by 15 ft. with 9-ft. ceilings, as shown in Figure 1. Each room contains 1620 cubic feet of space and according to the rule, each would be supplied with

$$4 \times 1620 = 108 \text{ cu. ft. per minute.}$$

Now let us determine the actual heat requirement of each room and compare:

Room A:

Assuming four windows each 2 ft. 6 in. by 4 ft. 6 in. and two doors each 3 ft. by 7 ft., we have 66 square feet of glass surface. Forty-two running feet of exposed wall multiplied by the ceiling height of nine feet gives a gross exposed wall area of 378 square feet. Net exposed wall = $378 - 66 = 312$ sq. ft. Assuming this room to have unheated attic space above with no attic flooring, we have $12 \times 15 = 180$ sq. ft. of cold ceiling. The content of the room is 1620 cubic feet and a conservative furnace man would figure at least one and one-half air changes per hour due to leakage. Thus the Standard Code would give us a heat pipe area of:

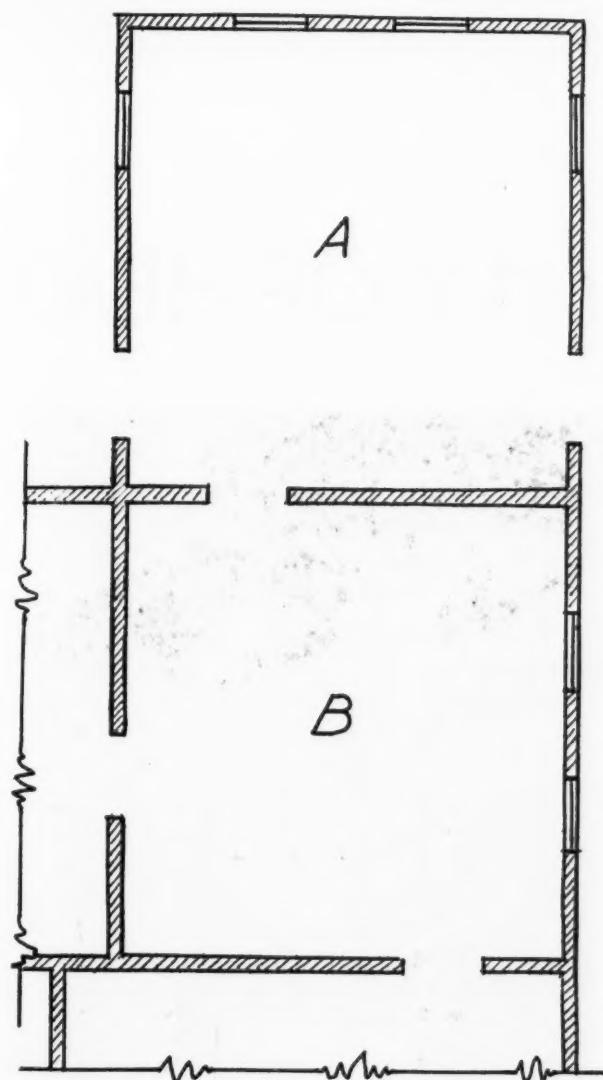
$$\frac{66}{12} + \frac{312}{60} + \frac{180}{50} + \frac{1620}{600} \times 9 = 153 \text{ sq. in.}$$

Room B:

Assuming two windows each 2 ft. 6 in. by 4 ft. 6 in., the glass surface would be 23 sq. ft. With only one 15-foot side exposed, the net exposed wall surface is $(9 \times 15) - 23 = 112$ sq. ft. Assuming this part of the house to be two-story, we have heated space above and do not include ceiling in heat loss computations. The leakage loss will be only one air change per hour and our Standard Code leader area will be:

$$\frac{23}{12} + \frac{112}{60} + \frac{1620}{800} \times 9 = 52 \text{ sq. in.}$$

Even without adding an exposure allowance which would increase still more the heat requirement of room A we find that it needs about three



Using this illustration, the text shows how rule-of-thumb methods for figuring heat requirements can go all "haywire" unless the designer knows basic principles and can correct for unusual conditions wherein rule-of-thumb falls down. See the text for a complete discussion of this problem.

times as much as room B. Yet the previously mentioned thumb rule would provide 108 cubic feet of warm air per minute to *each* of these rooms.

This case, which is not at all extreme, illustrates the danger that lurks in many convenient thumb rules.

For further study, let us determine in a basically correct manner, the hourly heat loss of each room. These heat losses can be read directly from the charts given in the March 2nd issue or they can be computed by multiplying the square inches of Standard Code leader area by 111, the number of B.t.u. supplied per square inch of first floor leader per hour.

Thus for room A, the heat requirement is $111 \times 153 = 16,983$ B.t.u. per hour, and for room B, it

is $111 \times 52 = 5,772$ B.t.u. per hour.

For a 70-degree room temperature, a formula developed and explained in a previous article can be used to give the correct number of cubic feet of air per minute.

$$\text{C.F.M.} = \frac{\text{B.t.u. per hour}}{1.08 \times (\text{Reg. temp.} - \text{room temp.})}$$

$1.08 \times (\text{Reg. temp.} - \text{room temp.})$

With a room temperature of 70 degrees, if we adopt 130 degrees as our register temperature, this formula reduces to the form:

$$\text{C.F.M.} = \frac{\text{B.t.u.}}{\frac{64.8}{16,983}} = \frac{16,983}{64.8} = 262 \text{ cu. ft.}$$

$$\frac{5,772}{64.8} = 89 \text{ cu. ft. per minute for room B.}$$

It will be noted that the thumb

rule which gave 108 C.F.M. for each of these rooms, was not so far wrong in the case of room B; a damper adjustment cutting the air delivery from 108 to 89 C.F.M. would take care of it and the heating contractor who uses such an approximate rule in his actual work, depends to a considerable extent on the use of dampers. Dampering would also help room A by limiting the air delivery to *other* rooms of the house and thus increasing the volume available for this exposed room, but it is anything but good practice to depend on dampering to more than double the air delivery to a given room.

Another way to increase the heat delivery to room A would be by "forced firing" to increase the register air temperature, but this also had better be avoided by more careful design. If the air volume is limited to 108 C.F.M., the required register air temperature to satisfy the room heat requirement of 16,983 B.t.u. per hour would be 216 degrees. This register temperature is determined as follows, from the equation:

$$\text{C.F.M.} = \frac{\text{B.t.u.}}{1.08 \times (\text{Reg. temp.} - \text{room temp.})}$$

$1.08 \times (\text{Reg. temp.} - \text{room temp.})$ which can be rearranged to read as follows:

$$\text{Reg. temp.} = \text{Room temp.} + \frac{\text{B.t.u.}}{1.08}$$

$$1.08 \times \text{C.F.M.}$$

Since a 70-degree room temperature is assumed and the volume of heated air delivered is to be 108 C.F.M., we have

$$\text{Reg. temp.} = 70 + \frac{16,983}{1.08 \times 108} = 70 + 146 = 216 \text{ deg. F.}$$

If a plant were actually designed for this building by the thumb rule method, the heat delivery to the rooms in question would be adjusted partly by damper control and partly by "forcing" the system a little to increase the register air temperature. It can be done. But for the sake of his reputation the

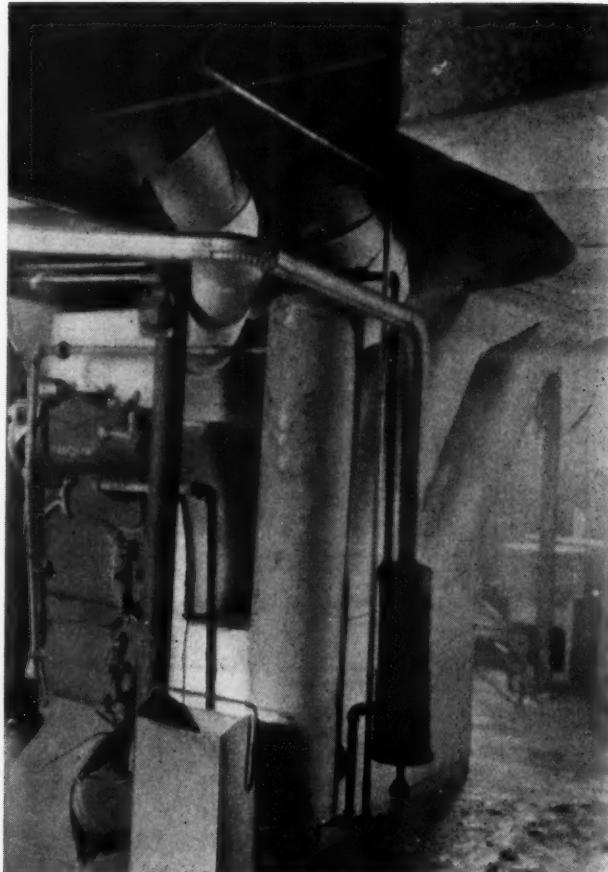
(Continued on page 26)

Banks & Coleman's Motto Has Been — GIVE THEM PLENTY OF HEAT

BACK in the days when scientific knowledge of warm air heating wasn't as plentiful as it is today, the wise old-timer always installed a furnace two or more inches oversized. And from this furnace he took leaders also oversized for the room they supplied. The result of this practice is that thousands of these furnaces are still satisfactorily serving their owners, are still in good condition because they didn't have to be forced, and have always kept the house warm.

In Fort Wayne, Indiana, Banks-Coleman Furnace Company has a long record of successful installa-

▲
The furnace was so located that practically every leader is short and direct. It so happened that this location was also between a group of piers forming the least used area of the floor. The furnace used is a FarQuar, the line Banks and Coleman handles
▼

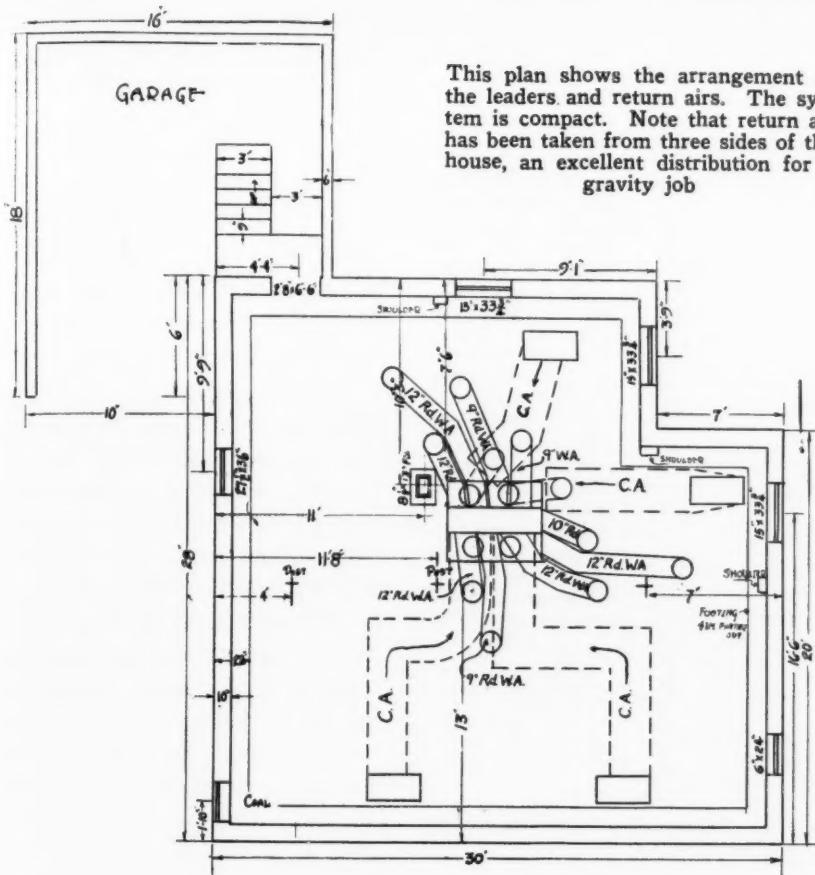


▲
The return air runs are all brought to a central point above the furnace in rectangular ducts. Short round pipes connect these ducts with the cold air shoes which in this case are two boxes on each side of the furnace
▼

tions. Mr. Banks, the senior member of the firm, is a real old-timer, while Mr. Coleman, the junior member grew up in the heating business. This firm has not tried to corner the furnace business of Fort Wayne. In fact, they have been content to do fewer jobs, make a satisfactory profit on each job and do each job just as well as they can.

One of the strictest rules they follow is: Give the customer plenty of heat. And they have found that even though the owner may burn a ton more a year, he is always warm and that is what he wants.

Give the customer plenty of heat is applied to every calculation this firm makes. If a room requires just



under 9 inches of warm air by Standard Code or B.t.u. figuring they try to use a 10 or 12-inch pipe. If the house demands a 24-inch furnace they try to sell a size larger; perhaps two sizes larger if exposure conditions seem to justify it. Easier firing, plenty of space for several hours' fuel supply are more appreciated than the saving from a furnace which is just a little too small.

This firm, through its long service to the Fort Wayne public, has found that home owners really like such service. Their record of giving satisfaction in heating service sells many jobs for them, for every customer is a Banks-Coleman salesman.

The photographs and the plans shown on these pages illustrate a typical Banks-Coleman installation. The house is owned by a high school professor who designed the house personally and planned the house to be the center of his varied personal interests. One thing he demanded was a satisfactory heating system.

The house stands in an exposed location on the edge of the city.

This plan shows the arrangement of the leaders and return airs. The system is compact. Note that return air has been taken from three sides of the house, an excellent distribution for a gravity job

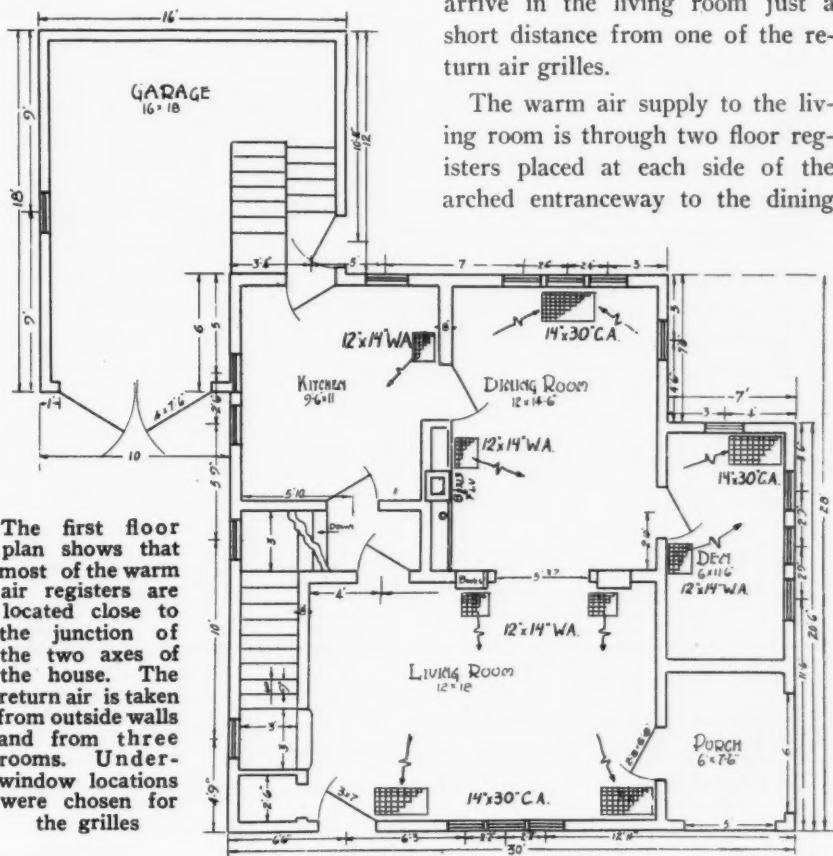
in all the heat loss of the building would be pretty high.

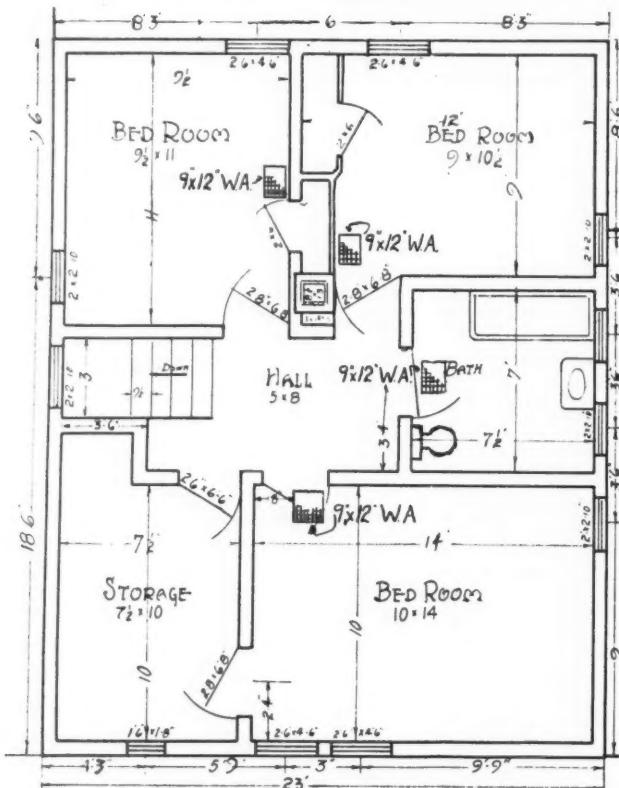
The installation designed by Banks-Coleman consists of a Far-Quar furnace operating on gravity. The bonnet of the furnace was built rectangular and carried up just as high as the basement head room would permit. The leaders are taken off the sides of the bonnet and run with little pitch to the boots.

The furnace was placed just about on the center point of the open basement. It is right against the flue and between three columns on floor area of least use. This central location made it possible to nicely balance the warm air off each side and balance almost as well the return air side of the system.

All the return air for the house is taken from the first floor. Two return grilles are set in the floor of the living room under the outside windows. Another return air is located on the outside wall of the dining room and the den. The second floor has a small central hall into which all rooms open and this hall connects with the stairs which arrive in the living room just a short distance from one of the return air grilles.

The warm air supply to the living room is through two floor registers placed at each side of the arched entranceway to the dining





There are two unusual features of the second floor layout—these are placing of one bedroom and the bath floor register directly in the doorway. This was necessary because of the structural framing of the house which the owner would not permit the contractor to cut. No return air is taken from the second floor directly, but open doors and the stairs are counted on to turn the trick

room. The dining room, kitchen and den are all supplied through

floor registers placed along inside walls.

APPLIED FAN FUNDAMENTALS

(Continued from page 23)

heating contractor should avoid the more or less tricky approximate rules and adhere to fundamentally correct principles until such time at least, as he has acquired sufficient experience with fan systems to enable him to draw on his experience and exercise reasonably sound judgment in applying arbitrary corrections to thumb rule calculations.

Many successful gravity systems were designed in the past by furnace men whose only "rule" was to divide the cubic content of a room by some such factor as 20, and let the quotient represent the number of square inches of leader area that would be required to heat the room.

Such a crude rule could only succeed when the man who applied it, had a sufficiently broad experience to insure that he could increase or decrease the "calculated" pipe area to care for unusual exposure or other conditions affecting the heat load of the room.

Even today, with our accurate and practical Standard Code, we frequently see some of the older and more experienced furnace men using such a simple thumb rule for quick estimating or for roughly checking the results obtained by the more accurate method.

Thumb rules for fan systems may be similarly used for checking purposes or making rough estimates but they should never be depended upon for accurate results.

On the second floor the warm air registers are all in the floors and centrally grouped in the floor area. It is interesting to note that in the bathroom and one bedroom this floor register is located right in the doorway. This was necessary because of the structural framing of the house which the owner would not permit the contractor to cut.

Just by way of comparison with a tight Standard Code figure, the living room, including the stair wall and an additional 10 per cent for exposure, would figure one 13½-inch pipe. Two twelves are used. The dining room would require one 9½-inch and has one 12-inch pipe. So through the whole house a considerable factor of safety was used.

All first floor warm air registers are 12 by 14 inches. The second floor warm air registers are 9 by 12 inches. All the return air grilles are 14 by 30 inches connected to an 18-inch round pipe.

THE WALDORF-ASTORIA

(Continued from page 13)

in suites having kitchens. In both rooms the standing edge is turned up behind the baseboard.

Because much of the metal was used in simple forms the shop work was comparatively easy. The erection required more time because the metal contractor had to follow the other trades up the building with his floor waterproofing and then with his tower sheathing. The outside work made use of the pipe scaffolding. This all-metal scaffolding is now used exclusively by New York contractors following several sad experiences with fire on wood scaffolds. The scaffold is composed of round galvanized pipes held together by heavy U-clamps.

The response to Platte Overton's engineering service was beyond our expectations. Although the plan was presented without previous publicity, an encouraging number of jobs were sent in. If you want to inquire about some job you have, write to him.

Electric Motor Requirements In Modern Heating [Part IV]

By H. WEICHSEL

Consulting Engineer, Wagner Electric Co., St. Louis

A feature which is essential in all motors is perfectly quiet operation. First of all it is, therefore, essential to design the motor for quiet operation and in some instances it is advisable to mount the motor so as to sound-insulate it against the floor or other member on which it may be mounted.

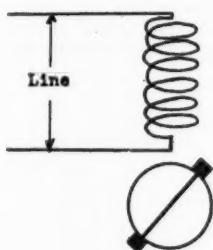
than that of the main winding. The rotor carries a squirrel cage winding.

The split-phase winding on the stator is connected to the line only during starting and produces during the starting period in combination with the main winding an imperfect rotating field. After the ma-

chine has reached a predetermined speed, this winding is disconnected from the line by aid of a centrifugal switch. Machines of this type have a relatively small starting torque and require a relatively large starting current.

A greatly improved type of single-phase motor is the single-phase, repulsion induction motor. Machines of this type have only one stator winding. The rotor is provided with a winding similar to that used in d.c. motors and is connected to a commutator. As a rule this commutator is of the vertical construction. Short-circuited brushes ride on the commutator during the starting period. This machine starts as a repulsion motor, and when up to approximately normal speed, the armature is short-

Repulsion Induction Motor



Split-Phase Motor

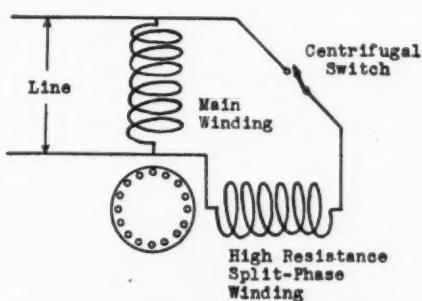
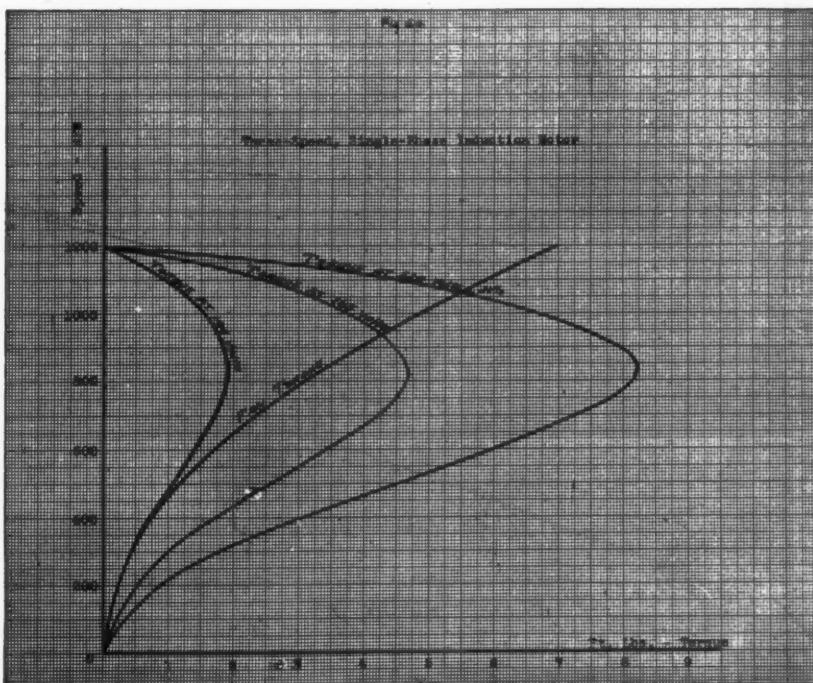


Fig. 59—The split phase motor is the oldest type of single phase induction machine. But an improved type is the single phase, repulsion induction motor. This is the schematic drawing of the winding. The machine starts as a repulsion motor, but when a predetermined speed is reached the armature is short circuited and the motor acts as an induction motor

In the majority of cases, particularly for furnace fans, it is advisable to have the machine totally enclosed so as to protect it against dirt which may be carried by the air which is circulated through the heater and also has the tendency to make the motor quieter.

The oldest type of single-phase motor is the so-called single-phase, split-phase motor which has one main winding on the stator which is connected to the line, and an auxiliary winding displaced against the main winding, and the resistance of the latter circuit is materially higher



circuited and the brushes are lifted. The motor now operates as an induction motor, see Fig. 59.

Machines of either one of these types are satisfactory for installations where the fan has to operate at only one definite speed. If an attempt is made, however, to decrease the speed of the machine, for instance, by lowering the voltage on the stator winding, it will be found that very little or no speed regulation is obtainable.

The reason for this is shown in Fig. 60, which gives the speed torque of the machine for full voltage, 75 per cent voltage, and 47 per cent voltage, and also shows the torque required by the blower. It will be seen from this figure that the case assumed gives speeds of 100, 90 and 38 per cent to zero, but the last speed is extremely indefinite, as the speed torque curve of the blower and that of the motor practically coincide. In practice for this condition the motor would come to a standstill.

If the single-phase motors are replaced by polyphase squirrel cage motors, speed torque curves are obtained as shown in Fig. 61. It will be noticed that now the blower torque curve intersects definitely

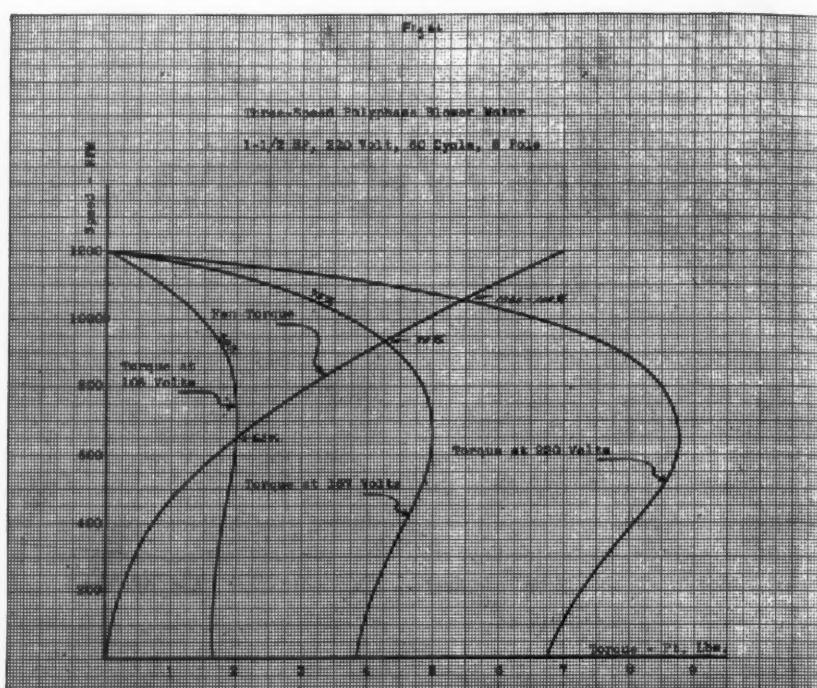


Fig. 61—In the polyphase, squirrel cage motors definite decreases in voltage are accompanied by corresponding decreases in motor speed

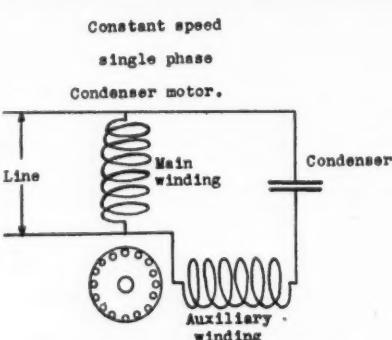


Fig. 62—This is a split phase motor wherein the phase is split by the aid of a condenser

with each of the speed torque curves of the polyphase motors and speed of 100, 90 and 60 per cent or normal speed are obtainable, corresponding to voltages of 100, 75 and 48 per cent.

A condition somewhere between these two extremes—single-phase induction motor and polyphase induction motor—can be obtained by making use of an old arrangement proposed by Steinmetz many years ago consisting of a split-phase motor and splitting the phase by aid of a condenser. Such an arrangement is shown in Fig. 62. It is identical to the standard split-phase motor with the exception that the condenser is connected in series with the auxiliary winding and that the auxiliary stator winding has a relatively low resistance. In the majority of cases, the condenser can be so dimensioned that it can remain in the circuit during starting and running.

A motor of this kind produces speed torque curves such as given in Fig. 63. It will be noticed that the fan torque curve intersects definitely in this example at three different points, corresponding to 100,

(Continued on page 31)

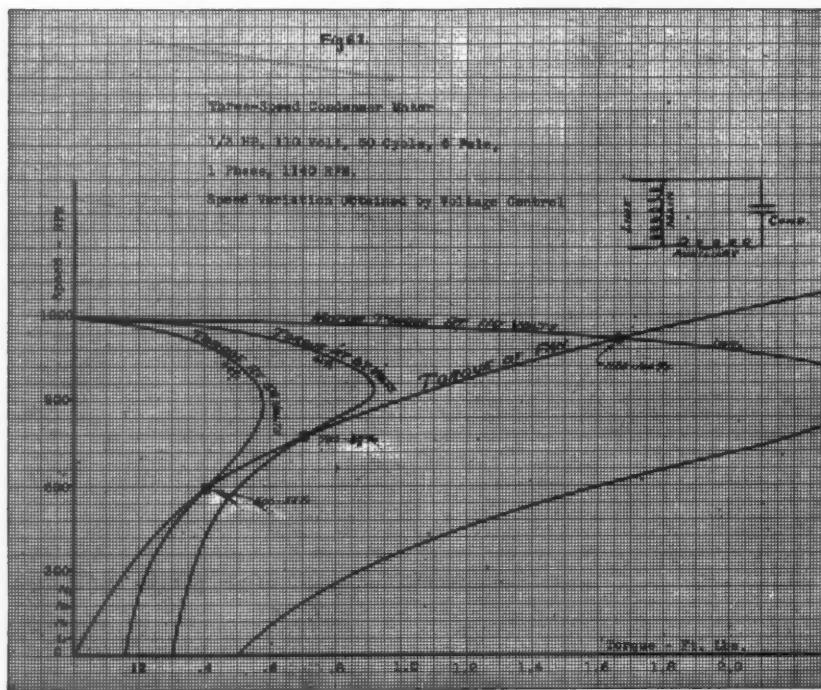
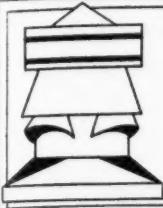
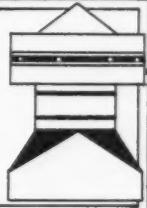


Fig. 63—The motor above gives a plotted operation like this. Definite reductions in speed accompany reductions in voltage, but the starting torque of these motors is less than in polyphase motors



GRAVITY EXHAUST VENTILATION



Ventilator and Pipe Capacities

I ASSUME from your letter that what you are interested in is data for practical use. The questions you bring up are interesting from an academic standpoint, but I believe that it is more practical to approach any given ventilation problem from a somewhat different angle than that indicated by you.

The efficiency, or, in other words, the capacity of a certain type of ventilator on any installation is dependent on so many different factors that it is not practical to attempt to calculate your capacities on the basis of these factors. It might be practical to take some of these factors into consideration if it were not for the fact that they are all so variable.

Take, for instance, the factor you mention of the amount of air an open pipe will exhaust. This will depend on the length of the pipe, the size of the pipe, the shape of the pipe, the number of bends, the character of the bends, the inclusion or absence of sweep, the horizontal runs, the surface of the pipe, the distance of the pipe opening above the roof, the accessibility of the wind and a few other factors which may be definitely determined.

However, the amount of air also will be influenced, perhaps to an even greater degree, by other factors which vary from day to day or even from minute to minute and which for that reason cannot be even roughly estimated. Among these variable

*The Paul R. Jordan Co., Indianapolis, Ind.

By PAUL R. JORDAN*

414 Bishop St.,
Houston, Texas.

The Paul R. Jordan Co.,
Indianapolis, Ind.

Dear Mr. Jordan:

I am a reader of your frequent articles in the "American Artisan" on ventilators and I should like to get some additional help on the same subject.

I have a set of formulas from the U. S. Bureau of Standards for capacities of different types of ventilators but they are given in proportion to an open pipe. I should like to get a practical formula for the amount of air an open pipe will exhaust. I have one formula for this but the size of pipe is not taken into consideration and therefore it is not practical. Also if you have a table giving the capacities of different types and sizes of ventilators I would like to have one. I should also like to have a formula or a table giving the density of air at different temperatures.

Thanking you very much for your favor, I am,

Respectfully yours,
(Signed) T. E. ROWE.

in the exhausted mixture, etc.

Theoretically, an open pipe will not exhaust any air. If it is set in a building under certain conditions air will flow out through it. Under certain conditions air will backdraft down through it. Under certain conditions, air blowing against the mouth in a certain direction will induce an upflow of air. However, if you change the direction of the wind, air will blow down through the same pipe. As wind direction is influenced by all of the objects surrounding the building and also by the roof contour, wind direction changes every few seconds.

The whole thing for practical purposes gets back to the matter of experience. Experience will naturally vary in some degree in different localities, but the variance is not so great as to render impractical general tables based on actual experience. A slight percentage of variance can be discounted by the commonsense of the applier, as based on his own experience and knowledge of his own locality. Conditions are more likely to be unfavorable than favorable, therefore it is safer to increase ventilator sizes than to decrease them.

There are many dependable tables of ventilator capacities published. There have been tables which were not dependable, due to the manufacturers desire to make it appear that their particular devices have phenomenal efficiency. It is safest to base your calculations on the assumption that one make of device is not very greatly different in effi-

factors are wind direction, wind velocity, inside temperature at the flue opening, outside temperature at the flue mouth, the amount of intake, the amount of moisture in the exhausted air and other elements such as heavier than air or lighter than air gases

ciency from another. It is true that some devices based on erratic designing are terribly inefficient. This applies especially to home-made ventilators. In general, well known manufactured and nationally advertised products are reasonably well designed and reasonably efficient.

Most tables are conservative. For instance our tables are based on anemometer tests made over a period of a good many years on actual jobs and in various parts of the United States. They are checked against the experience along the same line of the Indiana State Board of Health and of a number of other state boards.

Now as to capacities of different sizes and types of ventilators. The choice of the types of ventilators is really not based on capacity. It is based on the conditions which are met with and which have to be overcome. According to our tests and experience a good rotary ventilator will pull harder than any other type. Where a hard pull is necessary

Temperature, Deg. Fahr.	Weight per cubic foot, in pounds	Ratio of volume to volume at 70 Deg. Fahr.
-50	0.09690	0.7735
-25	0.09133	0.8206
-10	0.08828	0.8490
0	0.08636	0.8680
10	0.08453	0.8867
20	0.08276	0.9057
30	0.08107	0.9246
40	0.07945	0.9434
50	0.07788	0.9624
60	0.07640	0.9811
70	0.07495	1.0000
80	0.07356	1.0190
90	0.07222	1.0380
100	0.07093	1.0570
200	0.06018	1.2455
300	0.05225	1.4345
400	0.04618	1.6230
500	0.04138	1.8113
1000	0.02720	2.7560

the rotary ventilator is the thing to use. Where conditions are very favorable and all that is needed is something which will keep out weather and let the air out, a storm band ventilator may do it.

On the other hand there are places where due to appearance, locations of high tension wires, or other local conditions, a rotary ventilator is not desired, and greater pulling power is wanted than will be furnished by a storm band type ventilator. Under those

circumstances the siphon type ventilator is the logical answer.

You ask for a table of the density of air at different temperatures. I presume you refer to dry air and I am glad to give you this as follows: * [Table I]

The table of capacities I have before me covers three possible installations, namely, the fan flue where air is pushed to the ventilator; gravity flue, where the intake is restricted, and the open roof installation, where the intake is ample but there is no fan action. Such a table, used in conjunction with a table of recommended air changes per hour will give you a basis to work on. However, it will be advisable for you to get in touch with your ventilator manufacturer for advice on any specific ventilating problem you are called in upon, whenever it is possible for you to do so. If time makes it impossible for you to get your layout from him, you should at least have him check your layout.

*Taken from A. S. H. & V. E. Guide, 1930.

LOCKER ROOM VENTILATION

(Continued from page 21)

by separating the back to back lockers. The ducts then may run behind the lockers to the floor, along the baseboard, thence to fan inlet. Or, ducts may run directly to the ceiling.

Frequently ventilating fans and their motors may be installed on the roof, although basement location is more common in country clubs.

From Fig. 2 it is observed that there is a fresh air system. This is desirable, first, because natural sources of supply air may be impure, second, because the introduction of supply air assists the exhaust and, third, because the supply may be warmed during cool and cold months. Thus the system may be used for heating as well as ventilation during the winter.

If the incoming air is passed through the casing of a warm air furnace prior to being delivered to

the wash and locker rooms the complete system is unexcelled. It becomes a year-round arrangement.



We will publish in the next issue a story about one of the nicest country home automatic heating installations seen in a long time. The system shows how this type of buyer can be interested in forced air when good engineering, good selling, and good workmanship combine to establish confidence

ASSOCIATION ACTIVITIES



Milwaukee Will Hold Picnic August 5, 1931

The Milwaukee local has designated the 5th day of August, 1931, the gala day of the year, for then the annual picnic will be held at Wullf's Island on the Milwaukee River.

Complete arrangements are being made for the event and invitations will be issued in the very near future.

Anyone that attended the previous picnics of this local will know what is in store for them if they attend this year's affair.

Simplified Practice Recom- mendation on Sheet Steel Reaffirmed

Simplified practice recommendation R28-29 covering sheet steel has been reaffirmed by the standing committee of the industry, without change, for another year, according to an announcement by the division of simplified practice of the Bureau of Standards, Department of Commerce.

This recommendation provides for stock sizes of sheet steel in various gages, and has been instrumental in reducing variety from 1809 sizes to 209, or approximately 88 per cent.

Simplified Practice Recom- mendation on Roofing Ternes Reaffirmed

Simplified practice recommendation R30-28 on roofing terne was reaffirmed by the standing committee of the industry at its May, 1931, meeting, without change, for the ensuing six months, according to an announcement of the division of simplified practice of the National Bureau of Standards.

This simplification program establishes weights and thicknesses of roofing terne, and has been instrumental in reducing the number of stock sizes from 9 to 7, or approximately 22 per cent.

MOTORS IN HEATING

(Continued from page 28)

70 and 50 per cent or normal speed with 100, 67 and 49 per cent voltage impressed. It will be noticed, however, that the starting torques of these machines are less than those of standard polyphase motors.

Committee of Ten Gains Two New Members

Two more national associations were added to the membership of the Committee of Ten—Coal & Heating Industries at the June meeting of the committee, held in Baltimore in conjunction with the annual convention of the National Retail Coal Merchants Association.

The new members are the American Society of Heating & Ventilating Engineers and the Stoker Manufacturers Association. Pending the semi-annual meeting of the American Society of Heating & Ventilating Engineers at Swampscott the latter part of June, E. B. Langenberg of St. Louis has been designated the representative of the society on the committee. The Stoker Manufacturers Association will be represented on the committee by H. H. Kurtz, of the Chicago branch of the Iron Fireman Manufacturing Company, with R. C. Goddard, president of Combustioner, Inc., of Goshen, Indiana, as alternate.

Roofing and Sheet Metal Conference at Louisville

For the first time in the record of the sheet metal and roofing industries, contractors and dealers specializing in the fabrication, application and installation of roofing and metal products will hold their annual conventions during the same week, January 25, with headquarters at the Brown Hotel, Louisville, Ky.

The general sessions in manufacturing, distributing and contracting will be held during the morning, three days of that week. Fellowship luncheons will be held daily. During the afternoons and at other times that week, round table meetings will be held of the various groups with discussions of intensive problems of special interest within these industries, such as Sheet Metal Work, Asphalt Shingle Roofing and Siding, Built-up and Flat Roofing, Waterproofing and Insulation, Warm Air Heating, Asbestos, Slate and Tile Roofing.

Among the national organizations which will hold their annual conventions at Louisville in 1932, during the week of January 25, are: The National Association of Sheet Metal Contractors, The United Roofing Contractors Association of North America, The Roofing Contractors Division of the National Slate Association.

A. C. Willard Appointed Technical Advisor A. S. H. & V. E.

Here is news for the entire heating and ventilating profession and industry. A new and comprehensive policy developed from the experience of ten years of co-operative research becomes effective immediately.

Centralized control is continued through the chairman of the Committee on Research with the assistance of a technical advisor.

The Director of the Research Laboratory will have charge of all investigations at the society's laboratory in the Bureau of Mines Experiment Station, Pittsburgh.

C. V. Haynes, chairman of the Committee on Research, announces that in line with the policy approved by the committee, Arthur C. Willard, professor of heating and ventilation and head of the Department of Mechanical Engineering in the University of Illinois, has been retained as technical advisor for research.

Twelve problems are being studied at present either at the Research Laboratory in Pittsburgh or at the nine co-operating universities, and other investigations will be undertaken as approved by the Committee on Research as finances permit:

1. Atmospheric dust and air cleaning devices.
2. Air conditions and their relation to living comfort.
3. Physiological effects of atmospheric environment on human beings at work.
4. Heat transmission through building materials.
5. Conductivity studies on concrete.
6. Heat capacity of concrete slabs.
7. Heating effect of the sun on building roofs and walls.
8. Infiltration of air through walls and building openings.
9. Boiler testing with oil fuel and rating of oil burners.
10. Measurement of air flow through registers and grilles.
11. Characteristics of copper tubing for steam and hot water.
12. Performance characteristics of various enclosed types of cast-iron and non-ferrous radiators under actual heating service conditions.

NEW ITEMS and NEWS ITEMS

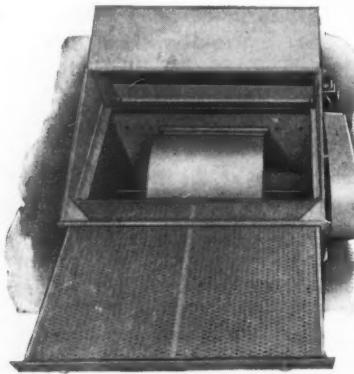
From and about the Manufacturers and Jobbers

Filtered-Aire Blower Introduced by American Fdry. and Furnace Co.

The American Foundry & Furnace Company of Bloomington, Illinois, are putting on the market the Filtered-Aire Blower, a blower which combines in a single unit filters for effectively cleaning the air. The filters used are time-tested, many having been in use for several years, and their efficiency thoroughly proven. The filters are easily cleaned by tapping on the floor and brushing with an electric vacuum cleaner.

The blower is a standard multivane blower, double width and double inlet. It will deliver its rated air volumes positively against resistances encountered in residence heating, either round pipe or rectangular duct work, up to $\frac{3}{8}$ -in. static pressure.

The bearings are located outside of the box and are self-aligning ball bearings.



The pulley has four speeds, making it possible to deliver the rated air volume of the blower against less than $\frac{1}{8}$ -in. static, $\frac{1}{8}$ -in. static, $\frac{1}{4}$ -in. static or $\frac{3}{8}$ -in. static. At top speed the blower is quiet. The bottom is built in as an integral part of the blower, making the entire fan chamber dust tight.

A by-pass damper for gravity operation on coal fired jobs or for gravity operation on constant flame type oil burning jobs is provided. This by-pass damper by-passes both filters and fan for gravity circulation and is furnished only where specified.

A new departure from furnace blower practice is found in the way Filtered-Aire Blowers are rated. The dealer is given definite recommendations of the size blower to use with the different firepot diameter furnaces or in steel furnaces the shell diameter.

New Jersey Zinc Co. Offers "High Grade Sheet Zinc," a New Product

A new high grade sheet zinc of superior bending properties is now being furnished by the New Jersey Zinc Company under the trade name High Grade Sheet Zinc.

According to the announcement made by this company, it is an ideal metal for jobs where the sheet metal worker wants the well known qualities of zinc plus all the advantages of metal which can be bent, seamed and formed—both with the grain and across the grain without fear of cracking.

This new sheet has an exceptionally smooth surface—the result of special rolling of special metal. The new metal is recommended for roofing, cornices, gutters, flashings and other formed articles involving intricate bending and seaming.

The new product is being supplied in all the commercial gauges and sizes, either flat in boxes or rolled in casks.

The New Jersey Zinc Company also announces that there is no increase in the price over that of the regular commercial grades.

Vorys Brothers, Inc., Columbus, Ohio, Moves Offices

Vorys Brothers, Inc., sheet metal distributors of Columbus, Ohio, announce removal of their offices and warehouse to a new location, 79 East Goodale Street, corner of Kerr Street, Columbus, Ohio. The new building is strategically laid out to handle the sheet metal man's requirements most efficiently and economically.

The company handles Armco Ingots, Revere Copper and Brass, Enduro K A 2 stainless iron sheet, Mueller and Armstrong Furnaces.

Tuttle & Bailey Move to Larger Quarters

The Tuttle & Bailey Mfg. Co., Inc., manufacturers of registers and grilles, have removed their New York office from 441 Lexington Avenue to the Commerce Building, 155 East Forty-fourth Street. The company will occupy larger and more commodious quarters at the new address, in order to better serve and handle this large and growing trade.

Cope-Swift Corp. Introduces a New Model Improved Burner

Construction details of a new model Cope-Swift oil burner show changes to make the burner even more simple, silent and efficient.

The outstanding feature of the new model is the atomizing of the oil by heat and centrifugal force combined. The oil comes through the shaft against a cone heated by exposure to the flame. Cracking is started by the heat and the oil passes backward through a nozzle. Centrifugal force then spreads the oil around the inner walls of the first cup, from which it is thrown to the second. Here a still thinner layer is struck by hot



gasses which are drawn through the third cup. As it is thrown in the form of a mist or fog from the edge of the cup, it is picked up and projected into the flame by the air current driven through the outer housing by the fan.

The unit includes the Triplex cup, the motor and the fan, all mounted on the single hollow shaft, is the only moving part of the burner. The motor assembly is mounted on a cast iron plate to be attached to the ash pit door frame, patented rib-sections permitting it to be quickly fitted to any size opening.

The Cope-Swift burner has full standard electric automatic controls. Present equipment is with mercoid solenoid electric oil valve, stack safety control, room thermostat and pressure safety control, all operated on a standard 110-volt circuit.

"Bill" Laffin Proud Father of Second Boy

From far off Los Angeles word has filtered that "Bill" Laffin is the proud father of another boy. This one, so the report goes, has a regular mop of black hair exceeding in abundance any his father ever had and no doubt ever will have. "Bill" Laffin will be remembered by hundreds of his friends in the furnace industry from his years of service with Tuttle and Bailey and later with Charles Johnson Company.

The youngster was born June 12. His name—John Charles. Mrs. Laffin, who was and is almost as widely known as "Bill," is reported doing nicely. Bill's home address these days is 352 North Croft Avenue, Los Angeles. He isn't in the furnace business so far as we know.

Lakeside Will Distribute Independent Air Filters

The Independent Air Filter Company, Chicago, has arranged with the Lakeside Company of Hermansville, Michigan, for the distribution of their air filters to the warm air heating industry. The arrangement is national in scope, but covers only such portion of the Independent line as is sold to dealers, jobbers and manufacturers of warm air heating equipment. The Independent Air Filter Company will continue as previously to market their standard products in the field of general ventilation and industrial applications.

The Independent sales organization deals largely with architects, engineers and contractors in the building industry and direct with industrial plants. The warm air industry is therefore somewhat foreign to their regular activities. The Lakeside Company specializes in this field and has an active national sales organization for the marketing of their "Furblo" line of blowers and other specialties. This keeps them in close contact with every possible outlet for air filters in that field.

The Independent line covers a wide range of types and sizes, but the most popular seller will be marketed by Lakeside under the trade name of "V-M," a filter using a replaceable filler composed of a special reinforced cotton fabric.

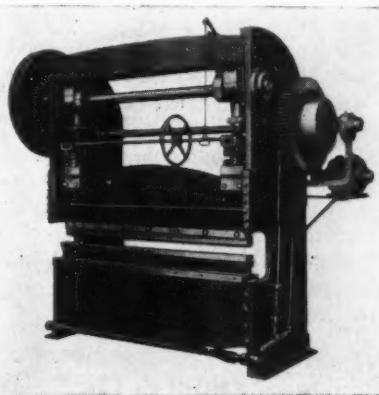
Pittston Stove Co. Buys Lehigh Patterns

The Pittston Stove Company, Pittston, Pennsylvania, announces they have purchased the entire line of "Lehigh" patterns comprising stoves, ranges, and furnaces. The company is now ready to fill orders for repair and replacement parts. The address of the company is Post Office Box 29, Pittston, Pennsylvania.

Dreis & Krump's New Light Type Press

The illustration shows the new Light Type Press Brake now being made by the Dreis & Krump Mfg. Co. This Light Type Press has been designed to fill a definite need in the production of many sheet metal products, including stoves, ranges, refrigerators, soda fountains, furniture and a great variety of sheet metal specialties.

These machines are built entirely of steel, arc welded. The gear wheel is also made of welded steel section. The housings are one piece with deep gap which



allows work longer than die length to be passed through machine from left to right.

These machines are being made in four capacities, and in lengths from 3 ft. to 8 ft. Literature covering same will be sent to anyone interested.

Dail Steel Products New Air Conditioner

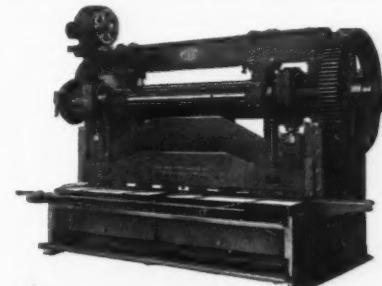
Announcement was made in a recent issue that the Dail Steel Products Company of Lansing, Michigan, had taken over the manufacture and distribution of a special oil and gas burning furnace that has been under development for the past two years by C. I. Murdock of Ann Arbor, Michigan. Since taking over this product, several new improvements and refinements have been made.

The Dail Steel Products Company now announce another development which they have perfected. A Sirroc type blower mounted on a frame built up from the floor is enclosed within the casing and on top of the furnace. The entire frame is set on rubber pads and the shaft has wood bearings so the operation is practically noiseless. An air washer is attached to each side of the casing and the cold air return connected with this air washer.

Complete catalog and specifications are now ready for dealers distribution and may be obtained by addressing the Dail Steel Products Company, Lansing, Michigan.

New Pexto Welded Steel Squaring Shear

The Peck Stow and Wilcox Company, Southington, Conn., now have ready for contractors and manufacturers a new welded steel squaring



shear of the overhead driven power type. Several features are listed for this new machine.

The new machine will cut soft steel in thicknesses from $3/16$ to $1/2$ inch. All members subjected to heavy tension or bending stresses are of welded steel construction. Cuts of from 72 to 168 inches can be made.

Complete details, literature and prices may be obtained from the manufacturer.

New Sheer Electric Gas Valve No. 31-A

The H. M. Sheer Company, Quincy, Illinois, announces a new electric motor-driven gas valve for use on low pressure gas firing equipment.

This valve is designated as the "Sheer Type 31-A," and consists of a small induction motor used in conjunction with a relay, the relay automatically holding the gear mechanism in an open position after the valve is



moved toward the open position by the electric motor. By this construction the wattage consumption is considerably lower, since the usual wattage is consumed for only $1\frac{1}{2}$ seconds (while the valve is open), then only 6 watts is used to hold the valve open after the relay engages. No power is consumed by the valve when closing or when closed. A 2-wire circuit is employed.

The Shur Type 31-A valve is furnished in 3-in., 1-in., $1\frac{1}{4}$ -in. and $1\frac{1}{2}$ -in.

Literature describing the valve and prices may be obtained from the manufacturer.

Kester Solder Co. Proud of Model Factory

An interesting news release received recently calls attention of the plant of the Kester Solder Company, manufacturers of self-fluxing Kester Solder.

This model plant is located on Wrightwood Avenue in Chicago, the buildings occupying an entire block.



The grounds surrounding the buildings are beautifully landscaped, and since the nearest neighboring factories are several blocks away, there is nothing to keep the sun-light from streaming into every office and plant building through wide and almost ceiling-high windows.

Richardson & Boynton Open Northwest Territory

Announcement is made of the appointment of the Stark-Davis Company, 118 Fourth St., Portland, Oregon, as wholesale distributors in the Northwestern territory, for Richardson & Boynton Company, New York, manufacturers of "Richardson" and "Perfect" Heating and Cooking Apparatus since 1837.

Large supplies of the latest R. & B. products will be maintained for immediate shipment from Portland stock and every dealer in the territory has been advised of this convenient source of supply.

The company is confident that this new distribution service will be a tremendous boon to every dealer in the Northwest.

Ryerson Purchases the Reed-Smith Co. of Milwaukee

In 1924 Joseph T. Ryerson & Son, Inc., purchased the interest of W. J. Reed and others in the Reed-Smith Company of Milwaukee, Wisconsin. Now the Ryerson Company has purchased the remaining stock and the firm becomes the Reed-Smith plant of Joseph T. Ryerson & Son of Wisconsin, Inc.

The Reed-Smith Company has been outstanding in its steel service to the Milwaukee industrial area. This new move will add further strength to the Ryerson Company's chain of warehouses located in ten principal steel-consuming areas of the country.

American Furnace Company New Gas Furnaces

American Furnace Company, 2719 Morgan Street, St. Louis, Mo., is now manufacturing a complete new line of gas furnaces to be known as the Thermo Warm Air Gas Heat—The System of Greatest Utility.

The line comprises small one section units, multiple section units, deluxe units for air conditioning, and both floor and ceiling industrial heating units.

The Thermo furnaces have a new type combustion unit made of cast iron and assembled from two sections, surface ground and bolted together.

The small unit occupies only $4\frac{1}{3}$ square feet of floor area. All units have a bright red lacquered casing.

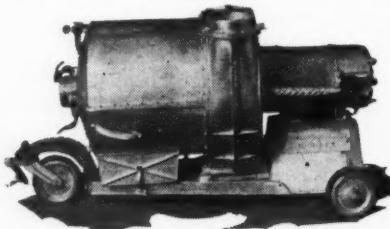
The deluxe line has complete equipment for air conditioning consisting of centrifugal blowers—one blower for each section—dry filters, blower bonnet control and house thermostat.

Complete literature on the equipment, prices and details may be secured from the manufacturer.

Densmore-Quinlan Co. New Suction Cleaner

The Densmore-Quinlan Company of Kenosha, Wisconsin, announce the introduction of a new portable suction cleaner for the heating industry. This cleaner weighs 75 pounds and can be operated by one man. Handles are attached for carrying and the machine runs on three wheels, one of which is swiveled.

The machine will operate on either A.C. or D.C. current of 110 to 125 volts. The cleaner is compact, requiring only $16\frac{1}{2}$ by 36 inches of floor area. The machine is built of the best quality cast aluminum. S. K. F. bearings are used throughout. The motor is a G.E. hooked



to a fan of special design. The fan and motor are so designed that dirt and oil cannot work through. Every machine is guaranteed against defective or broken parts for one year.

The cleaner will be sold with complete cleaning attachments. These include a special brush for warm air pipes, a flat brush for cold air lines, a corner brush for registers, an outside brush for pipes, a radiator scratch brush, brush for boiler pipes, scaling tubes and both a 2- and $1\frac{1}{2}$ -in. hose.

Young Ventilating Co. New Regulator

The Young Ventilating Company, 2703 Wodland Avenue, Cleveland, Ohio, announces a new positive ventilating control, the Young Regulator, which controls the volume of air flowing through a ventilation duct by opening or closing a damper with which it is connected by a $\frac{1}{8}$ -inch square bar. A special indicator



and dial show accurately the position of the damper in the duct.

The damper is set by operating two nuts on the shaft. The outer nut, which is eight sided, controls the adjustment of the damper. The outer nut, which is ten sided and larger, locks the regulator at any desired position. Placing this lock nut on the inside makes it difficult to turn with any ordinary wrench.

A special two ended wrench to fit both nuts comes with the regulator. The regulator is made of guaranteed rust proof material and may be had in chrome nickel or any other desired finish.

E. B. Langenberg Opens Engineering Office

Due to an upheaval of minority stockholders, E. B. Langenberg has severed his active connection with the Langenberg Manufacturing Co. and has opened an office in St. Louis under the name of "E-B" Engineering Company.

The new company will furnish complete designs for air heating systems, including all necessary appurtenances thereto.

This service is to be available to manufacturers, dealers and architects in such a way that they can serve their trade in a new way.

For the manufacturer, it will save salesmen's time, engineering and drafting personnel.

To the architect, it will give a service not available at the present time and will enable him to secure bids on a single design.

The dealer will be able to supply his customers with up-to-date design and blue prints at nominal cost.

E. B. Langenberg has over twenty-six years' experience in the installation field.



IF YOU'RE WISE
YOU'LL WRITE
FOR THESE

2
BOOKS



EXPLAINING
The
WISE
BALANCED
BIG-**3** LINE

WISE
20
SERIES

WISE
GAS FIRED

WISE
40
SERIES

THE WISE FURNACE COMPANY
Akron, Ohio

WISE DEALERS SELL WISE FURNACES

Your Most Productive Dollar



IS in the super suction cleaner because you get more than a machine; you get a well-rounded business and a Plan Book which makes it pay from the start. You get a complete supply of direct advertising printed with your name, address, phone; also prospect cards.

Dealers say that our right start is worth more than they pay for the machine. What good is a cleaner without the best plan to work it?

Get the new bag, three times the former size; suction stronger than ever; cleaner removes from base, to go up stairs to registers; the safety trap which protects the fan from heavy objects if sucked in; the metal container which empties soot like a coal scuttle; tools for all places; 50 ft. of best cord; a speedy, one-man outfit; the first price covers it all.

The National Super Service Company
1944 North 13th Street, Toledo, Ohio

Without obligation, send me the free PLAN BOOK which helps sell new furnaces and repairs, and tell me how I can try the cleaner free.

Name _____

Street _____

City _____ State _____



THE ROAD TO PROFIT



MR. FURNACE DEALER can not be found in making counterfeit money, passing rubber checks, or selling **BOOTLEG STEEL FURNACES** (a product sold promiscuously under various brands other than the manufacturers name).

The emotional spree of mass production, ten year guarantee, and selling bootleg steel furnaces is over.

Now it will take hard-headed, two fisted, He-men, and sober business methods to make profits, and they must sell a real **HE-MAN** furnace that sells on something more than a wobbly 10 year guarantee.

Hook up to Peerless for 1931. You can always outsell the Bootleg Steel Furnace competition.

THE PEERLESS FOUNDRY COMPANY

Pioneers in Warm Air Heating Since 1895

INDIANAPOLIS

INDIANA



THE RIVAL!

EAVES TROUGH HANGER

A heavy, easily adjusted hanger made in four sizes, 4", 4½", 5" and 6", and of copper or galvanized iron. Each hanger is subjected to a most rigid inspection so that uniform quality is assured at all times.

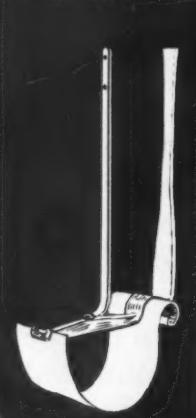
They are shipped in compact heavy corrugated cardboard cartons. If you are interested in rigid construction, quick, easy adjustment, sure locked bead, and low price, then order The "Rival."

Sold By Leading Jobbers

BERGER BROS. CO.
229-231 ARCH ST.
PHILADELPHIA, PA.

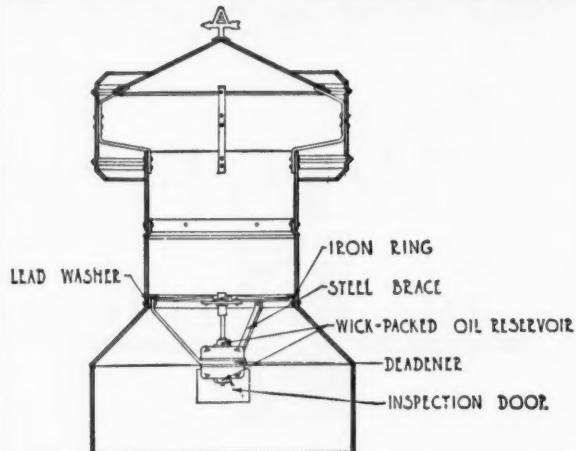
140 S. Dearborn St.
CHICAGO

WRITE
FOR OUR
CATALOG



JORDAN AERO VENTILATION

F-DIRECT CONNECTED-FAN VENTILATOR



A Unit for greater efficiency.
Combining gravity, ventilator and fan action.
Eliminating wind and weather hazard.

Backed by a complete engineering service

PAUL R. JORDAN & CO.
630 South Delaware St. Indianapolis, Ind.

Mention AMERICAN ARTISAN in your reply—Thank you!

THE Fast SELLER in the furnace field

Year after year—for over a quarter century—Rybolt Dealers have been making big money selling and installing Ryb bolt Furnaces.

Now the Ryb bolt offers bigger opportunities than ever. High quality, known dependability, a one-piece radiator of uniform thickness with smoke and cleanout collars cast on, and many other features of construction, make it the outstanding value in the furnace field.

The complete details will be mailed upon request. Why not write or wire for them now?

THE RYBOLT HEATER COMPANY

Ashland, Ohio

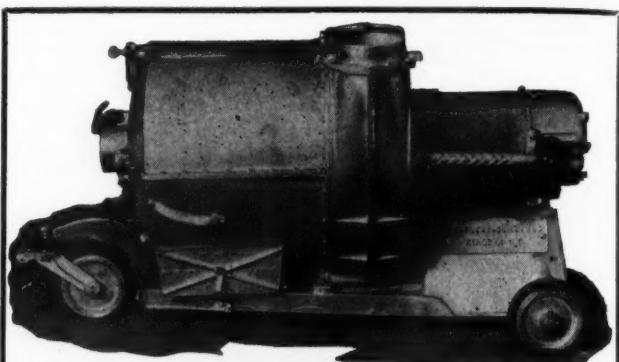
Cincinnati

Indianapolis



RYBOLT FURNACE

Mention AMERICAN ARTISAN in your reply—Thank you!



CLEANING POWER

That's what we offer with a "D. Q." Cleaner. Power to perform quickly and satisfactorily. That "Extra Power" which puts a profit in your pocket.

THE "D. Q." CLEANER IS LIGHT IN WEIGHT, BUT POWERFUL IN PERFORMANCE



Fully guaranteed and operates on any ordinary house current A.C. or D.C. 110 to 125 Volts.

Densmore-Quinlan Co.
Kenosha, Wisconsin

Write for This Illustrated Folder for Full "D.Q." Data

File This Copy

When you have finished reading this issue of AMERICAN ARTISAN, pass it on to others in your organization, marking the articles in which they should be particularly interested.

Then file it for future reference. You never know when you will encounter a problem in your business that is covered in this very issue.

Bradon
MANUFACTURING
COMPANY
TERRE HAUTE
INDIANA

Miters
Demand
"Champion" Miters
and Fittings
from your
Jobber!

Champion
PRODUCTS



MAGNIFY A BRILLION FURNACE 200 TIMES

That will tell you why we have adopted the

"ELECTROMELT" PROCESS

BUT—Better still, let us send you folder No. 10E, which explains this process fully and gives detailed information about the Brillion line. WRITE

BRILLION FURNACE CO.
BRILLION, WIS.



Have You Received Your Copy?

A new catalogue describing and illustrating in color the sensational new line of Thermo Gas Furnaces is just off the press and is being mailed as fast as requests can be handled. Have you written for your copy? If not, do so at once as the dealer in each territory who applies first will have an important sales advantage.

The Thermo line of Gas Furnaces includes a furnace for every type of domestic or business building and each with important Thermo features that place them years in advance of the field.

If you are anxious to build a successful business in this fast growing market, investigate the Thermo line without delay.

*Cut Out This Ad and Pin
to Your Letterhead*

AMERICAN FURNACE CO.

2719-31 Morgan Street
St. Louis, Mo.

A. A.



YOUNG REGULATOR

A Locking and Indicating
Device for Air Conditioning
and Ventilating Systems



Controls the volume of air flow through duct—the simplest and most effective method of controlling and showing position of volume damper. Positively tamperproof. Made of rust-resisting metals. Exclusive patented features. Write for catalog.

THE YOUNG VENTILATING CO.
2703 Woodland Avenue • Cleveland, Ohio



SHEETS

For Every
Purpose

It is the Pure Iron alloyed with the right amount of Copper that gives GOHI SHEETS their lasting and rust-resisting qualities. Developed and manufactured exclusively by

THE NEWPORT ROLLING MILL COMPANY
NEWPORT, KENTUCKY

Say you saw it in AMERICAN ARTISAN—Thank you!

GET ACQUAINTED
 With Our
REPAIR PART SERVICE
 We Furnish Repairs for
**Furnaces, Stoves
 and Ranges**
 From Our Stock



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A. G. BRAUER SUPPLY COMPANY
 314-318 North Third Street St. Louis, Mo.

**THE WORLD'S LARGEST
 MANUFACTURERS OF
 STEEL FURNACES**

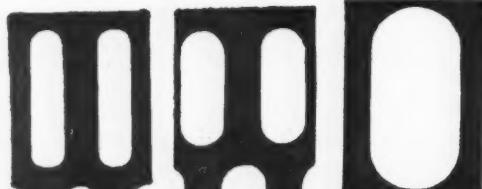
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 FURNACE CO., INC.

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THE J. M. & L. A.
OSBORN CO.
 MANUFACTURERS & DISTRIBUTORS
 DETROIT-CLEVELAND-BUFFALO
 "Everything Used in Sheet Metal Work"

PERFORATED METALS



All Sizes and Shapes of Holes
 In Steel, Zinc, Brass, Copper, Tinplate, etc.
 For All Screening, Ventilating and Draining
EVERYTHING IN PERFORATING METAL

THE HARRINGTON & KING PERFORATING CO.
 5649 FILLMORE ST.-CHICAGO, ILL., U. S. A.
 NEW YORK OFFICE, 114 LIBERTY ST.

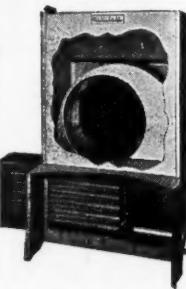
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 The CORRECT AIR MACHINE

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COOLING

Do you realize that hundreds of dealers are making big profits selling blowers and fans on the basis of Home Cooling during the summer as well as Forced Heat in winter. They are, and "KORECTAIRE" is ideal for such sales. It is a positive blower—it humidifies the air and cleans it.

Write for full details today
 The KORECTAIRE is the most quiet blower on the market—it is the easiest to install—it lends itself to any number of cold air returns. Ask for illustrated circulars and prices now.

WATT MFG. COMPANY



STERLING, ILL.

CHICAGO STEEL SLITTING SHEAR
 LIGHT—POWERFUL
 DURABLE



Capacity 10 gauge sheets

Any Length or Width

Flat Bars 3/16x2"

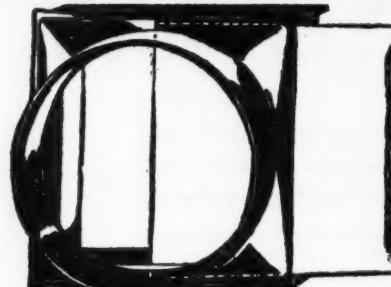
Weight 22 pounds

Price \$15.00 Net

F. O. B. Chicago

Made of pressed steel and equipped with hold-down. Blades of highest grade crucible steel. Most indispensable high grade shears made. Equal to other shears selling at over twice the price. **ORDER YOURS TODAY.**
DREIS & KRUMP MFG. CO., 7404 Loomis St., Chicago

Keep Moisture Out of Smoke Pipes



with the
"NO-DAMP"

It's a

- 1 Draft Control
- 2 Thimble
- 3 Protection Against Moisture
- 4 Pipe Saver

IT SELLS ON SIGHT
 —EASY TO INSTALL

Made of Cast Iron

Write today for circulars and prices
EISSLER HARDWARE

209-211 Fifth Street

Aurora, Illinois

POPULARITY
 Helps You Sell!

Western popularity has been gained through years of steady service. Its record has made many friends. You'll find such a reputation a big help in your sales.

Write for Catalog No. 31 showing the new Western GAS Furnace.

WESTERN

WESTERN STEEL
 PRODUCTS CO.

130 Commonwealth Avenue
 Duluth, Minn.

Mention AMERICAN ARTISAN in your reply—Thank you!

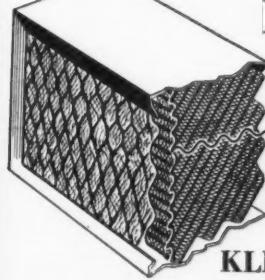
MONCRIEF**Pipe
and Fittings**

We supply everything used on a warm air heating job. Send for our big Pipe and Fittings Book.

The Henry Furnace & Foundry Co.
3471 East 49th Street
Cleveland, Ohio

20,500

SQUARE INCHES OF
FILTERING AREA IS
BUILT INTO EACH

**KLEENAIRE
FILTER UNIT**

This is why they are more efficient.

There are many other superior features of design.
All Metal—Non-Matting.

Write for Details

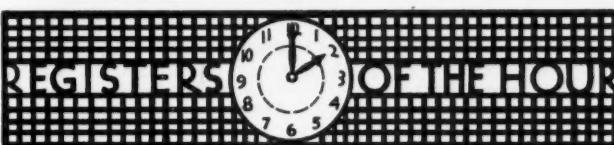
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Stevens Point, Wis.



GEO. W. DIENER MFG. CO.
404 North Monticello Ave. Chicago

The "Torrid" Furnace is designed to give a tremendous amount of heat, much more than that furnished by the ordinary tinner's furnace.

A fuel saver and generating machine of the finest quality made at the price.



AUER Quality Merchandise Is Your Satisfaction

There is an AUER Register and Grille for every need—the Colonial, Aueristocrat, Economy, and Pro-Tex-Wall—but the catalog will tell you better. Write for it today.

AUER REGISTER COMPANY
3608 Payne Avenue CLEVELAND, OHIO

Boost Profit with This Heat Booster



LET US TELL YOU HOW—

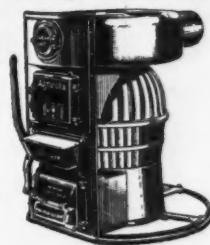
And Send You Our Catalog and
Name of Nearest Jobber

A-C. Mfg. Company, 417 Sherman St., Pontiac, Ill.

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To be sure of perfect fitting castings and parts, order only genuine AGRICOLA Repair Parts. Prompt shipments.

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Offices in principal cities



"American Seal" FURNACE CEMENT

*Roof Cement—Stove Putty
Plumbers Putty*

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WILLIAM CONNORS PAINT MFG. CO.

Established 1852
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JAMES L. PERKINS, Western Distributor
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The AUTOMATIC DRIP HUMIDIFIER



Entirely Different
Write for Details

Correct and Controlled Humidity

THE Automatic Drip Humidifier is unlike all others. The amount of humidity desired is *regulated*. It is simple, fool-proof, durable, reliable and high grade in every respect.

For every warm air heating installation and especially desirable with oil heat because of control feature.

For efficiency and profits sell the Automatic Drip Humidifier—send for complete information today.

AUTOMATIC HUMIDIFIER COMPANY
CEDAR FALLS, IOWA

~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

METALS

PIG IRON

Chicago Fdy., No. 2.....	\$17.50
Southern Fdy., No. 2.....	17.01
Lake Superior Charcoal.....	27.04
Malleable.....	17.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC 20x28 112 sheets.....	\$23.80
IX 20x28.....	27.45
IXX 20x28 56 sheets.....	14.95
IXXX 20x28.....	16.10
XXXX 20x28.....	17.85

TERNE PLATES

Per Box	
IC 20x28, 40-lb. 112 sheets.....	\$23.50
IX 20x28, 40-lb. 112 sheets.....	26.00
IC 20x28, 25-lb. 112 sheets.....	20.05
IX 20x28, 25-lb. 112 sheets.....	22.90
IC 20x28, 20-lb. 112 sheets.....	14.55
IV 20x28, 20-lb. 112 sheets.....	21.35

"ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.....	\$4.15
3/16 in.—100 lbs.....	4.05
1/4 in.—100 lbs.....	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28.....	\$12.00
Cokes, 90 lbs., base, 20x28.....	12.20
Cokes, 100 lbs., base, 20x28.....	13.75
Cokes, 107 lbs., base, IC, 20x28.....	12.75
Cokes, 135 lbs., base, IX, 20x28.....	14.75
Cokes, 155 lbs., base, 2X, 56 sheets.....	8.50
Cokes, 175 lbs., base, 3X, 56 sheets.....	9.35
Cokes, 195 lbs., base, 4X, 56 sheets.....	10.25

BLUE ANNEALED SHEETS

Base 10 ga.....	per 100 lbs. \$3.35
"Armco" 10 ga.....	per 100 lbs. 4.15

ONE PASS COLD ROLLED BLACK

No. 18-20.....	per 100 lbs. \$3.55
No. 22.....	per 100 lbs. 3.70
No. 24.....	per 100 lbs. 3.75
No. 26.....	per 100 lbs. 3.85
No. 27.....	per 100 lbs. 3.90
No. 28.....	per 100 lbs. 4.00

GALVANIZED

No. 16.....	per 100 lbs. \$3.85
No. 18.....	per 100 lbs. 4.00
No. 20.....	per 100 lbs. 4.15
No. 22.....	per 100 lbs. 4.20
(Standard differentials on extras to apply)	
No. 24.....	per 100 lbs. \$4.35
No. 26.....	per 100 lbs. 4.60
No. 27.....	per 100 lbs. 4.70
No. 28.....	per 100 lbs. 4.85
"Armco" 24.....	per 100 lbs. 5.85

BAR SOLDER

Warranted 50-50.....	per 100 lbs. \$19.25
45-55.....	per 100 lbs. 17.00
48-52.....	per 100 lbs. 17.75
Plumbers'.....	per 100 lbs. 15.50

ZINC

In Slabs.....	\$5.00
---------------	--------

SHEET ZINC

Cask Lots (600 lbs.).....	\$12.00
Sheet Lots (100 lbs.).....	13.00

BRASS

Sheets, Chicago base.....	16 1/4 c
Tubing, braz'd, Chicago base.....	24 1/4 c
Tubing, seamless, Chicago base.....	21 1/4 c
Wire, Chicago base.....	16 c
Rods, Chicago base.....	13 1/4 c

COPPER

Sheets, Chicago base.....	18 1/2 c
Tubing, seamless, Chicago base.....	21 1/2 c
Wire, plain rd., 8 B. & S. Ga. and heavier.....	12 1/2 c

LEAD

American Pig.....	\$6.00
Bar.....	7.50

TIN

Bar Tin.....	per 100 lbs. \$33.00
Pig Tin.....	per 100 lbs. 32.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16.....	5c per lb.
Roll board.....	5 1/2 c per lb.
Mill board, 3/32 to 1/4.....	5 1/2 c per lb.

Corrugated paper (250 sq. ft. per roll)..... \$4.00 per roll

ASBESTOS SEGMENTS

8 in.....	per 25 sets \$1.85
9 in.....	per 25 sets 2.10
10 in.....	per 25 sets 2.35
12 in.....	per 25 sets 2.65

CEMENT FURNACE

5-lb. cans, net.....	\$0.40
10-lb. cans, net.....	0.80
25-lb. cans, net.....	2.00

Per 100 lbs..... 7.50

CLIPS

Damper

No-Rivet Steel, with tail pieces, per gross.....	\$9.50
Rivet Steel, with tail pieces, per gross.....	7.50
Tail pieces, per gross.....	2.40

COPPER FOOTING

Copper Footing..... 43 %

CORNICE BRAKES

Chicago Steel Bending..... Net

Nos. 1 to 6B..... Net

CUT-OFFS

Gal. plain, round or cor. rd.

26 gauge.....	30 %
28 gauge.....	35 %

DAMPERS

Yankee Warm Air.....

7 inch, doz.....	\$1.60
8 inch, doz.....	2.20
9 inch, doz.....	2.60

10 inch, doz..... 2.80

12 inch, doz..... 3.50

14 inch, doz..... 5.00

EAVES TROUGH

Galv. Crimpedge, crated..... 75-15 %

Zinc..... 60 %

Zinc..... 60 %

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round at Crimp.....

28 gauge..... 60-10 %

26 gauge..... 50 %

24 gauge..... 15 %

Plain Rd. and Rd. Corr.

28 gauge..... 60-10 %

26 gauge..... 50 %

24 gauge..... 15 %

Galvanized Terne Steel.....

28 gauge..... 60-10 %

26 gauge..... 50 %

24 gauge..... 15 %

Square Corrugated

28 gauge.....	55 %
26 gauge.....	40 %

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.....	55 %
Nested solid.....	70 & 5 %

PORTE

1, 1 1/4, 1 1/2 inch.....	45 %
Nested solid.....	70 & 5 %

Copper

16 oz., all designs.....	50 %
Zinc.....	60 %

Zinc

All styles.....	60 %
Zinc.....	60 %

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue.....	Doz.
No. 28 Gauge.....	1.25
5 inch.....	1.25
6 inch.....	1.25
7 inch.....	1.75

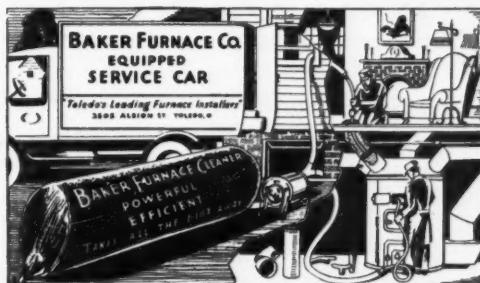
ADJUSTABLE—Uniform Blue

No. 28 Gauge, Uniform Blue.....	Each

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HERE'S HOW TO MAKE SUMMER PROFITS

Furnace cleanings lead to repairs and replacements which run into many dollars. Outside of the profit made on the cleaning job many dollars are found from these necessary repairs and replacements. Invest a few dollars in a real furnace cleaner. It will put you in for big profits.



The BAKER Furnace Cleaner is the cleaner you have been looking for—the cleaner with the extra big bag—portable, easy to handle, efficient in operation. You can obtain the BAKER Furnace Cleaner at the unusually low price of \$234. You can use the BAKER Furnace Cleaner for five days to prove its value and efficiency. Let us tell you about the BAKER Cleaner and the free offer we make progressive dealers.

BAKER FURNACE CO., 2507 Albion Street, Toledo, Ohio

RIVAL STRAP CORP. 308 WEST 20th ST.
NEW YORK, N. Y.

THE RIVAL AND FITRITE One-Piece Ornamental Leader Straps



DAVID LEVOW 308 WEST 20 ST.
NEW YORK



A SIMPLE ILLUSTRATION

*"Note the FINS
on any air-cooled motor"*

"FINS" on a Furnace serve the same purpose

The Fins simply radiate and throw off the heat, giving additional radiation, more economical fuel consumption and more certain heating satisfaction. A most simple, yet efficient improvement.

*Only One Furnace
Offers "FINNED Heating"
Satisfaction and Economy*

"HALL-NEAL VICTOR"

The Victor is backed by a most unusual dealer franchise. Let us tell you about it.

HALL-NEAL FURNACE COMPANY
1324 Capitol Avenue Indianapolis, Indiana

HEAT RADIATING FINS

VARIABLE SPEED MOTOR DRIVEN VENTILATORS

Burt Engineers have again increased the effectiveness and widened the range of uses for the Burt Fan Ventilator by the application of variable speed motors. It is now possible to obtain high speed, low speed or gravity ventilation by using this ventilator. Full details giving speed ranges and sizes will be sent on request.

The BURT MFG. Co.

Ventilators-Oil Filters-Exhaust Heads

930 S. High St., Akron, Ohio



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AIR CONDITIONING

is the biggest thing in the furnace industry today. Find out what WEIR is doing about it.

THE MEYER FURNACE CO.
Peoria Illinois

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

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Do You Want Furnace Cement That is Workable?

Then Order

LASTIK
WAMPUM BRAND
FURNACE CEMENT



LASTIK PRODUCTS CO., INC.
OLIVER BUILDING PITTSBURGH, PA.

PREMIER

FURNACES

"Constantly Improved,
Supreme in their Field"
Guaranteed for 10 Years

PREMIER
De Luxe
(Cast Iron)

Write
for
1931
Catalog

PREMIER
Duo-Weld
(Steel)

Install **ÆOLUS** Improved VENTILATORS



FOR industrial buildings,
schools, homes, theaters, etc.
Made in 14 different metals.
Constant ventilation—no noise
—no upkeep.

ÆOLUS DICKINSON
Industrial Division of Paul Dickinson,
Inc.
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"It's different than all the rest"

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Better Time Than Now

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"FABRIKATED"

COLD AIR FACES

"Fabrikated"
Floor Registers

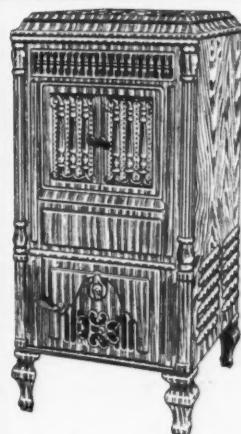
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OPEN
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Let Us Tell You About
The
Vernois
Super Heater

A handsome addition to the home that radiates and circulates the heat.
A powerful heater that is unconditionally guaranteed for three years.

MT. VERNON
FURNACE & MFG. CO.
Mt. Vernon Illinois

BUYERS' DIRECTORY

(Continued from page 44)

Machinery—Culvert	Registers—Wood	Sheets—Alloy	Solder—Self-Fluxing
Bertach & Co., Cambridge City, Ind. Interstate Machinery Co., Chicago, Ill.	American Wood Register Co., Plymouth, Ind. Auer Register Co., Cleveland, Ohio Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	Inland Steel Co., Chicago, Ill. International Nickel Co., New York, N. Y. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Newport Rolling Mill Co., Newport, Ky. Osborn Co., The J. M. & L. A., Cleveland, Ohio Republic Steel Corp., Youngstown, Ohio Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	Kester Solder Co., Chicago, Ill. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Machinery—Rebuilt	Repairs—Stove and Furnace	Brauer Supply Co., A. G., St. Louis, Mo.	Diener Mfg. Co., G. W., Chicago, Ill. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Interstate Machinery Co., Chicago, Ill.			
Machines—Tinsmith's	Ridging		Soldering Furnaces
Bertach & Co., Cambridge City, Ind. Dreis & Krump Mfg. Co., Chicago, Ill. Hyro Mfg. Co., New York, N. Y. Interstate Machinery Co., Chicago, Ill. Marshalltown Mfg. Co., Marshalltown, Iowa Osborn Co., The J. M. & L. A., Cleveland, Ohio Peck, Stow & Wilcox Co., Southington, Conn. Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve. Viking Shear Co., Erie, Pa. Whitney Mfg. Co., W. A., Rockford, Ill. Yoder Co., The, Cleveland, O.	Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	J. M. & L. A. Osborn Co., Cleveland, Ohio	Diener Mfg. Co., G. W., Chicago, Ill. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Metal Lath—Expanded	Roofing Cement	Connors Paint Mfg. Co., Wm., Troy, N. Y. Lastik Products Corp., Pittsburgh, Pa.	Specialties—Hardware
Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.			Diener Mfg. Co., G. W., Chicago, Ill.
Miters	Roof Flashing	Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	Stars—Hard Iron Cleaning
Barnes Metal Products Co., Chicago, Ill. Berger Bros Co., Philadelphia, Pa. Braden Mfg. Co., Terre Haute, Ind. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	Connors Paint Mfg. Co., Wm., Troy, N. Y. Lastik Products Corp., Pittsburgh, Pa.	American Brass Co., Waterbury, Conn. Revere Copper and Brass Inc., Rome, N. Y.	Fanner Mfg. Co., Cleveland, Ohio
Nails—Hardened Masonry	Roof Paints		Stove Pipe and Fittings
Parker-Kalon Corp., New York, N. Y.			Meyer & Bro. Co., F., Peoria, Ill. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.
Oil Burners	Roofing—Iron and Steel		Stove and Furnace Trimmings
Rock Oil Burner Corp., Madison, Wis. McIlvane Burner Corp., Evanston, Ill. Northern Oil Burners Inc., Minneapolis, Minn. Silent Automatic Corp., Detroit, Mich.	Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio Inland Steel Co., Chicago, Ill. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Newport Rolling Mill Co., The, Newport, Ky. Osborn Co., The J. M. & L. A., Cleveland, Ohio Republic Steel Corp., Youngstown, Ohio Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	Inland Steel Co., Chicago, Ill. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Newport Rolling Mill Co., Newport, Ky. Osborn Co., The J. M. & L. A., Cleveland, Ohio Republic Steel Corp., Youngstown, Ohio Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	Fanner Mfg. Co., Cleveland, Ohio
Paint	Roofing—Tin and Terne		Strainers—Roof
Connors Paint Mfg. Co., Wm., Troy, N. Y.	Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Osborn Co., The J. M. & L. A., Cleveland, Ohio Republic Steel Corp., Youngstown, Ohio Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Osborn Co., The J. M. & L. A., Cleveland, Ohio Republic Steel Corp., Youngstown, Ohio	David Levow, New York, N. Y. Rival Strap Corp., New York, N. Y.
Perforated Metals	Rubbish Burners	Hart & Cooley Co., Holland, Mich.	Straps—Ornamental Pipe
Chicago Perforating Co., Chicago Harrington & King Perforating Co., Chicago, Ill.	School—Sheet Metal Pattern Drafting		David Levow, New York, N. Y. Rival Strap Corp., New York, N. Y.
Punches		St. Louis Technical Institute, St. Louis, Mo.	
Bertach & Co., Cambridge City, Ind. Hyro Mfg. Co., New York, N. Y. Interstate Machinery Co., Chicago, Ill. Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve. W. A. Whitney Mfg. Co., Rockford, Ill.	Schools—Warm Air Heating		Tinplate
Punches—Combination Bench and Hand	Screws—Hardened Metallic Drive	St. Louis Technical Institute, St. Louis, Mo.	Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Osborn Co., The J. M. & L. A., Cleveland, Ohio
Parker-Kalon Corp., New York, N. Y.	Parker-Kalon Corp., 200 Varick St., New York		
Punches—Hand	Screws—Hardened Self-Tapping, Sheet Metal		
Parker-Kalon Corp., New York, N. Y. W. A. Whitney Mfg. Co., Rockford, Ill.	Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Parker-Kalon Corp., New York	Inland Steel Co., Chicago, Ill. Newport Rolling Mill Co., Newport, Ky. Osborn Co., The J. M. & L. A., Cleveland, Ohio Republic Steel Corp., Youngstown, Ohio	
Putty-Stove	Screens—Perforated Metal		
Connors Paint Mfg. Co., Wm., Troy, N. Y.	Harrington & King Perforating Co., Chicago, Ill.		
Radiator Cabinets	Scuppers	Aeolus Dickinson, Chicago, Ill.	
Hart & Cooley Co., New Britain, Conn. Tuttle & Bailey Mfg. Co., New York	Shears—Hand and Power		
Registers—Warm Air	Interstate Machinery Co., Chicago, Ill. Marshalltown Mfg. Co., Marshalltown, Iowa Peck, Stow & Wilcox Co., Southington, Conn. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve. Viking Shear Co., Erie, Pa. Yoder Co., The, Cleveland, O.	Kester Solder Co., Chicago, Ill. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.	
Auer Register Co., Cleveland, Ohio Forest City Foundries Co., Cleveland, Ohio Hart & Cooley Co., Holland, Mich. Henry Furnace & Fdy. Co., Cleveland, Ohio Independent Register & Mfg. Co., Cleveland, Ohio Meyer & Bro. Co., F., Peoria, Ill. Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C. Rock Island Register Co., Rock Island, Ill. Symonds Register Co., St. Louis, Mo. Tuttle & Bailey Mfg. Co., New York United States Register Co., Battle Creek, Mich.	Sheet Metal Screws—Hardened, Self-Tapping	Parker-Kalon Corp., New York	Solder—Acid Core
			Kester Solder Co., Chicago, Ill. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
			Solder—Rosin Core
			Kester Solder Co., Chicago, Ill.
			Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.

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By Many Furnace Manufacturers

SIMPLEX HUMIDIFIER

TRULY AUTOMATIC | NO FLOAT | EASY TO INSTALL



WRITE
for Proposition

SALLADA MFG. CO.
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You can now heat with fresh air as economically as with recirculated air—and better.

FRESHAIRE HEATING SYSTEM

Write for details

GENERAL HEATING COMPANY
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WIRE DROP HANDLES for FURNACE DOORS



Furnished Nickel Plated in Following
Lengths:

2 $\frac{5}{8}$ " - 3 $\frac{3}{8}$ " - 3 $\frac{3}{8}$ " - 4 $\frac{1}{2}$ " - 5 $\frac{1}{2}$ "

We also manufacture a complete line of Furnace and Stove Trimmings—such as Pokers, Lifters, Scrapers, Shovels, Cranks, Shakers, Lever Handles, Turnkeys, Knobs, Air Mixers, Register Screws, Gas Stove Fittings, Valve Wheels, Furnace Regulators, etc.

Write for Samples and Prices

THE FANNER MFG. COMPANY
Brookside Park CLEVELAND, OHIO

The Viking Shear

Compound lever handle—removable blades. Upper blade away from mechanic enabling easy following of work—an exclusive Viking feature.



Sold Under a Guarantee—Send for Particulars

VIKING SHEAR CO., Erie, Pa.

HOWES YANKEE HOT-AIR DAMPER

IT'S
STRONG



The most
economical
because it's
better and
complete

Mfd. by
The S. M. HOWES CO.
Dept. G.
Boston, Massachusetts

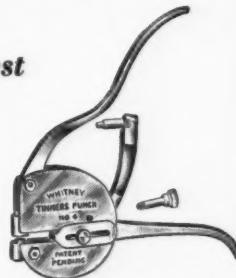
WHITNEY Lever PUNCHES:

GOOD TOOLS

Are Always Cheapest

No. 4—ONE HAND TINNER'S PUNCH

Capacity, $\frac{1}{4}$ inch hole through 16 Gauge. Punches 1/16 inch to 9/32 inch by 1/64 inch. Punch and Die stay in perfect alignment because side plates carry the strain. Has adjustable gauge to regulate holes from.



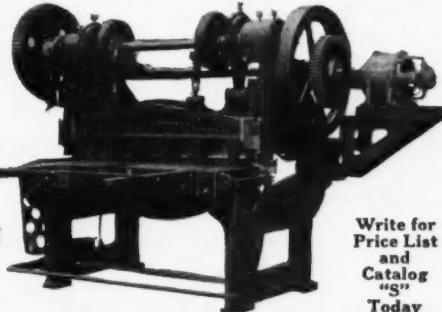
W. A. WHITNEY MFG. COMPANY
636 Race Street Rockford, Ill.

BERTSCH POWER SHEAR

BELT
OR
MOTOR
DRIVE

Takes
lightest
sheets to
Heaviest
Plates

Built in all
Standard
Sizes and
Capacities



Write for
Price List
and
Catalog
"S"
Today

BERTSCH & CO., Cambridge City, Ind.

WATERBURY SEAMLESS FURNACE REG. U. S. PAT. OFF. PIPE OR PIPELESS Guaranteed

Permanently Gas-Tight

The Waterman-Waterbury Co.
1128 Jackson Street N. E.
Minneapolis Minnesota

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Classified Advertising

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddie Company, Marshfield, Wis.

For Sale—Buffalo Forge Angle Iron Cutter No. 2, in good condition. \$10.00 cash buys it. Address X-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—One Niagara Deep Throat Bader No. 2, with four sets of rolls and standard. All in good condition. Will sell about $\frac{1}{2}$ price. Address B-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Man, with full set of plumbing and heating tools and a few hundred dollars to invest, wishes to get in with some good firm as manager of shop. Will take shop on percentage if desired. Can handle any job, large or small. Prefer some good town in Illinois. Best of references as to ability, etc. Address K-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Rent, with option to buy if so desired—Fully equipped sheet metal shop in good locality. Owner desires to occupy half of space for other purpose. Will rent on percentage basis. Reliable person with best references need only reply. Address L-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Heating and sheet metal shop in western North Dakota town of 5,000 population. Well equipped shop having a new 8-foot brake and all tools in good condition. A very good opening for an experienced heating man. Other interests reason for selling. Address T-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Sheet metal and plumbing shop. Good location in live Indiana town, 15,000 population. Fully equipped. Terms to responsible party. Address S-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Best equipped general shop in northern Ohio town of 2,200. Very excellent exclusive furnace agency. Seven towns, two cities, Ordnance Depot and Army Camp within 12-mile radius. Other interests compel full attention. Address P-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

HELP WANTED

HELP WANTED

Salesmen on attractive basis wanted in several territories. Refer to page 4 for description of line which also includes radiation and steam and hot water boiler heating equipment. Address Department A-311-A, International Heater Company, 101 Park Avenue, Utica, New York. Z-538

Manufacturers' Agents

Wanted to sell our furnace cement, roofing paint and cement and calking compounds. Our consistent trade paper advertising is creating demand. Exclusive territory given with liberal commission. Address W-538, AMERICAN ARTISAN, 139 N. Clark Street, Chicago, Illinois.

HELP WANTED

WANTED

National distributor of Hardware, Implements, Plumbing, Heating, Paints, etc., with many stores, offers opportunity for permanent employment to men who have operated or been employed in Hardware Stores handling above lines.

Must be able to plan and estimate plumbing and heating jobs and also handle ALL other duties connected with the successful operation of a country Hardware Store.

Write in confidence giving all details, including age, names of former employers and past and present salary.

Address A-539
AMERICAN ARTISAN
139 N. Clark St. Chicago, Ill.

Manufacturers Representative

Desires to represent reputable manufacturers on Pacific Coast. Address C-538, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Illinois.

SITUATION WANTED

Situation Wanted—By first class sheet metal worker, plumber, and furnace man with 25 years experience. Married, sober, steady and reliable. Best of references. Address F-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—A first class sheet metal worker and furnace man will give four weeks labor for Board to show his ability to handle the job. Address G-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—Who wants a first-class, all-around sheet metal worker? Can do furnace and roofing work of all kinds; draft all patterns; neat, accurate, thoroughly experienced and capable; but best proof is actual performance. Prefer shop in well established hardware. Best references. Address G. M. S., 838 Wayne Avenue, Defiance, Ohio. O-538

Situation Wanted—By a first class hardware clerk and salesman. Also good mechanic in shop if needed. Would like to make a change. If you are in need of a capable and dependable man, answer this ad. Address J-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.



NEW AIR CONDITIONING
Is spreading like wild fire. The public in general are asking about it—people want to know how it will serve them in comfort, satisfaction, and to have something on the Jones's, etc.

Can You Answer Them Fully?

The INSTITUTE has specialized air conditioning courses for Forced Warm Air Plants, also large Mechanical Systems, etc. It is the ideal thing for Shop Owners, their Sons, Partners, etc., to prepare NOW to be good Salesmen later. Please indicate your desire:

Home Study Instruction.
 Private Class Instruction.

This is our 22nd year for Training Tradesmen, like yourself. Full information is free; check your Course, and write today. Get in line for Fall business recovery.

Sheet Metal Design and Pattern Drafting.
 Specialized Short Sheet Metal Courses.
 Heating Ventilating Engineering.

Special Warm Air and Forced Air Heating.
 Air Conditioning for Fan H. & V. Eng.
 Contracting and Estimating.

THE ST. LOUIS TECHNICAL INSTITUTE 4543 CLAYTON AVE.
ST. LOUIS, MO.

Say you saw it in AMERICAN ARTISAN—Thank you!

NOW! An Exclusive Dealer Franchise!



Effective immediately, the U. S. Furnace will be distributed through one big live dealer in each city.

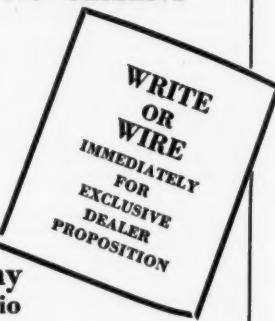
This is the first time in the history of the United States Furnace Company that this high-grade furnace will be sold through dealer organizations. It's an opportunity which will be welcomed by live dealers everywhere. It will pay you well to investigate.

Selling Features You Can't Overlook

DOUBLE JOINTS—NO BOLTS—NO CEMENT

10 YEAR GUARANTEE | HEAVIEST FURNACE MADE | ONE PIECE CONE SHAPED DEAD CENTER GRATE

and many other outstanding features



The United States Furnace Company
724 Market Street Youngstown, Ohio

ENGINEERING SERVICE BY MAIL— at Unheard of Prices

LOOK THESE PLAN PRICES OVER

RESIDENCES

Up to and including 5 rooms	\$1.10 per room
5 to 9 rooms inclusive	\$1.00 per room
10 to 15 rooms inclusive	\$0.85 per room
16 to 20 rooms inclusive	\$0.80 per room
21 rooms and over	\$0.75 per room

CHURCHES

Up to and including 50,000 cu. ft. gross content	\$0.12 per 1,000 cu. ft.
50,000 cu. ft. and over	\$0.10 per cu. ft.

SCHOOLS

20,000 to 50,000 cu. ft.	\$0.30 per 1,000 cu. ft.
50,000 to 70,000 cu. ft.	\$0.25 per 1,000 cu. ft.
70,000 to 100,000 cu. ft.	\$0.20 per 1,000 cu. ft.
100,000 cu. ft. and over	\$0.15 per 1,000 cu. ft.

FACTORIES, GARAGES

Duct systems	\$0.12 per 1,000 cu. ft. gross content.
Unit heater systems	\$0.10 per 1,000 cu. ft. gross content.

SPECIAL NOTE

Where heating systems include filters, washers, temperature control as EXTRA EQUIPMENT—add 20 per cent to above prices.

Where filters, washers, temperature controls are A PART OF THE HEATER AND ARE UNDER ONE CASING—listed prices apply.

For complete working plans detailing all trunk lines in $\frac{1}{2}$ -inch scale and showing details of elbows, stacks, branches, sections, cross sections of walls—add 50 per cent to list prices.

Add \$0.01 per square foot of direct radiation for combination systems.

I offer this service on a mail order basis and at unheard-of low prices. I supply complete plans so you can show your buyer just what he is going to get and what the system will look like and how it will work. These plans will save you many dollars in labor, time and material.

At these prices you can afford a consulting engineer's services with every plan you submit. And you can guarantee every installation.

HOW TO USE THIS SERVICE

Send architect's plans. If you must send sketches, these should be as complete as possible and show dimensions of building, rooms, ceiling heights, locations of doors and windows. Show all floors, glass areas, type of construction, compass points, direction of prevailing winds. In short, show all items considered in Standard Code calculations.

The More Complete the Information—the Better the Layout

Include with your plans all information about the equipment you expect or would like to use. I DO NOT SELL OR RECOMMEND ANY PARTICULAR EQUIPMENT!

List separately or send as a letter all peculiarities of the building, all owner's preferences such as furnace location, possible future additions, special room conditions such as especially high temperatures, etc.

Be sure to mail all material first class.

Terms are cash on receipt of the plans.

WHAT YOU GET

Finished plans will be mailed within 48 hours after your plans are received.

I send you one set of blue prints showing all floor plans with heater location, duct or leader location and arrangement, stack, register and grille locations and sizes, sizes of all trunks and branches or leaders. Also one complete data sheet to show how the installation was figured.

This material will be assembled so you can show your prospect or architect just what he is getting, how it will look, and how much thought you spent on the project. You get an extra set of blue prints for your buyer at \$0.04 per square foot.

PLATTE OVERTON Consulting Engineer

2100 City Hall Square Bldg., Chicago

Mention AMERICAN ARTISAN in your reply—Thank you!

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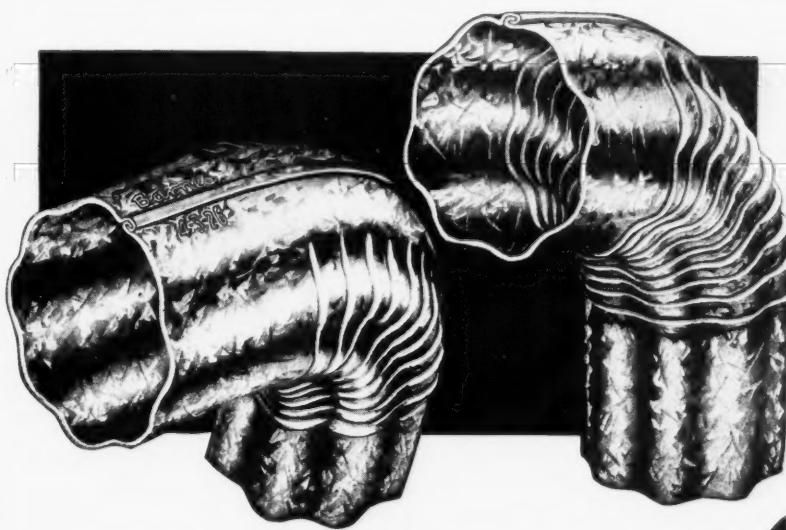
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The "Barnes" Super Elbow

Stand on one and test its strength



WHERE

*Quality
Counts*

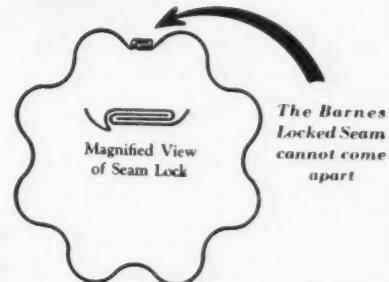
Barnes
*is
First
Choice*

HEAVIER — STRONGER

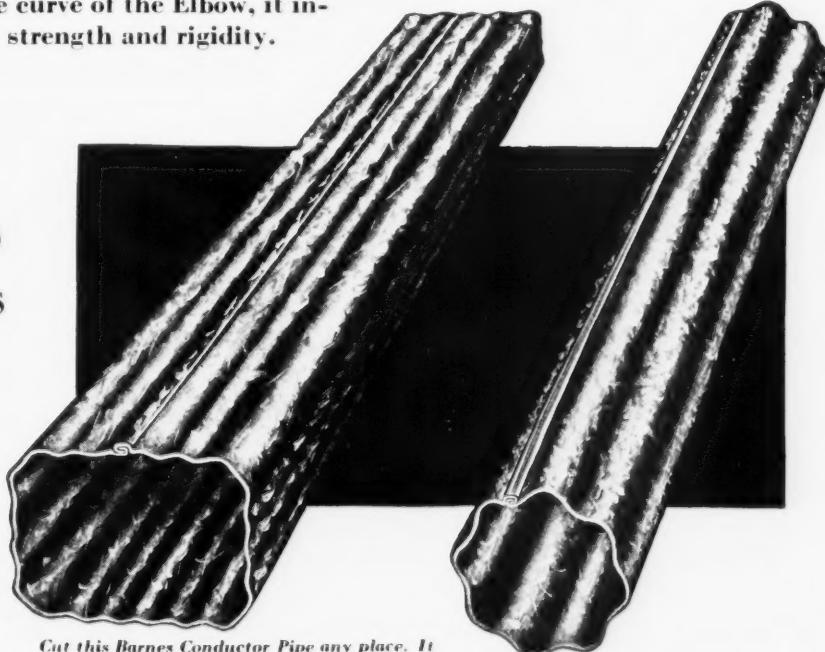
...yet cost no more than the ordinary elbow

Send for a sample

THE Barnes locked seam as used in Elbows and Conductor is an exclusive Barnes feature. Being on the outside curve of the Elbow, it insures greatest strength and rigidity.



**USE
Barnes
PRODUCTS
TO
BUILD
BETTER
BUSINESS**



Cut this Barnes Conductor Pipe any place. It won't split. The lock-seam is your guarantee.

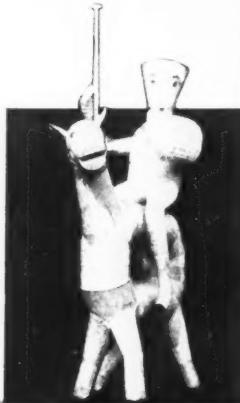
BARNES METAL PRODUCTS COMPANY

4425 W. 16th Street

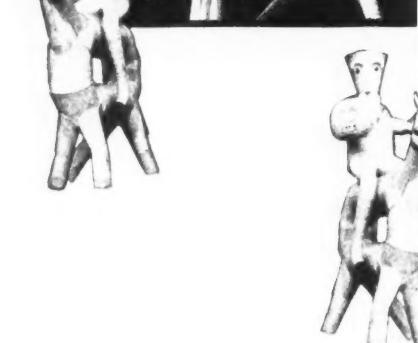
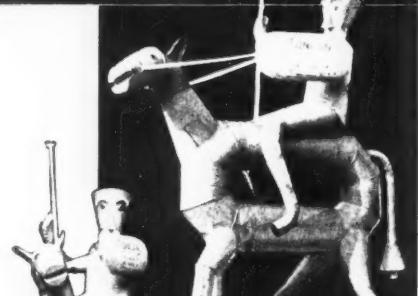
Manufacturers of

Chicago, Illinois

Conductor Pipe, Elbows, Eaves Trough and Fittings. All Sizes, All Metals



MR. BROWN ...FINDS IT PAYS HIM TO ADVERTISE TONCAN IRON



PHONE 58-195

BROWNIE'S SUNSHINE TIN SHOP
C. E. BROWN, PROP.
MASTER ROOFERS
953 CENTRAL AVE.
ST. PETERSBURG, FLA.

ESTIMATES GIVEN

May 4, 1931

Republic Steel Corp.,
Youngstown, Ohio.

Dear Sirs:-

I am writing this voluntarily as the only means I have of expressing the appreciation of a practical mechanic who has handled all kinds of metal for the past 38 years. You have my permission to use this as you see fit.

I have just recently started in the sheet metal business in this city and I use exclusively Toncan Iron. I have been using Toncan for years and find it very superior to any sheets I can buy, both from the standpoint of wear and ease of working. It does not flake in forming; as other metals do. It is softer and more uniform in weight.

I am sending you some pictures of a float which I had in our Festival of States parade last month and one of the pictures is plain enough so it speaks Toncan for itself. I made these men so the labels Toncan were in front and in back. Also the shield they carry carries the label and believe me, I have been busy explaining what Toncan is since that time.

I have been unable to get any of the Toncan Shop signs here, so if you think I am entitled to them or anything else you have in the way of advertising, I would be very glad to help in my small way to put Toncan across.

Hoping to hear from you and trusting that you may be able in some way to get out of this what I feel in sending it to you. I remain

Very truly yours,

C. E. Brown

.... AND SO WILL YOU

Because of its long life in service, Toncan Iron builds good will. And because good will is the heart and soul of every business, this alloy of refined iron, copper and molybdenum, a development of more than twenty years, can be a mighty important factor in helping to show a consistent year-in year-out profit. Send for list of sales helps.

